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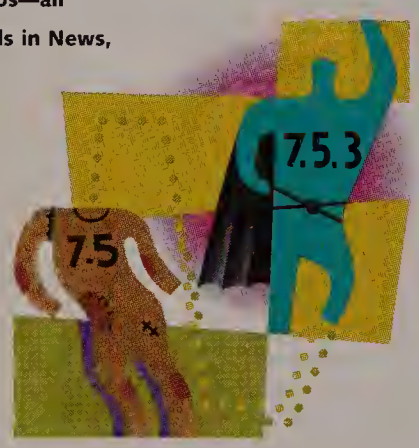

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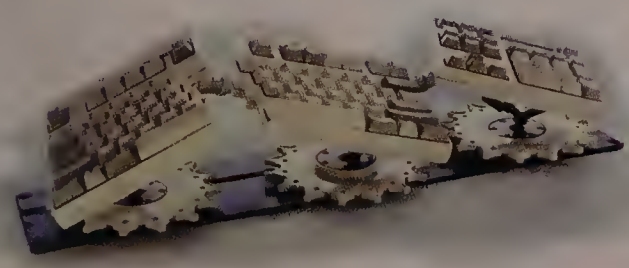

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2

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4

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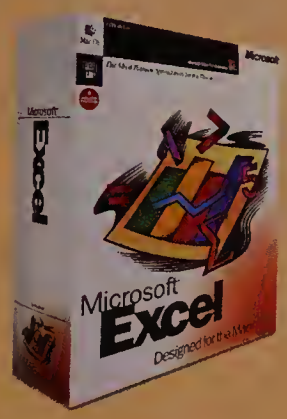

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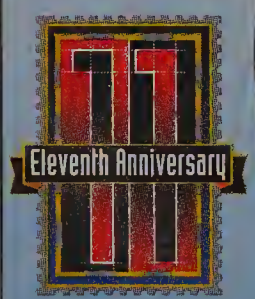

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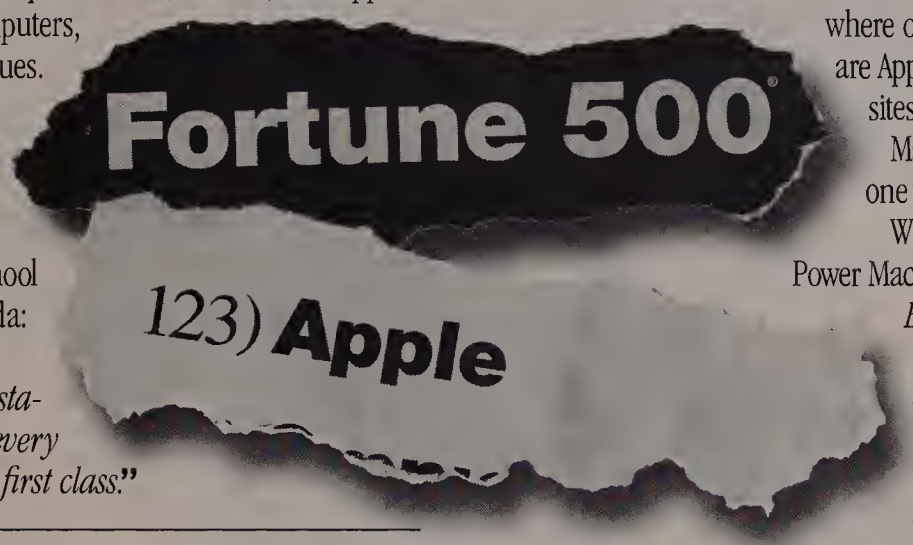

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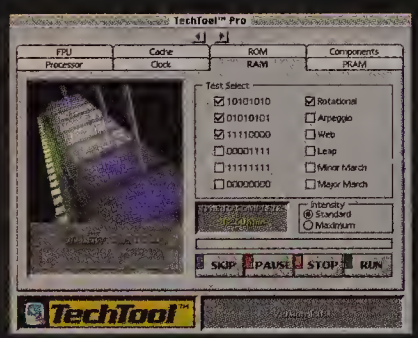

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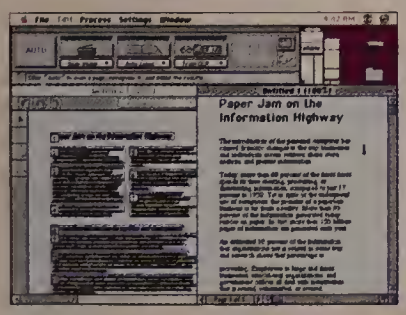

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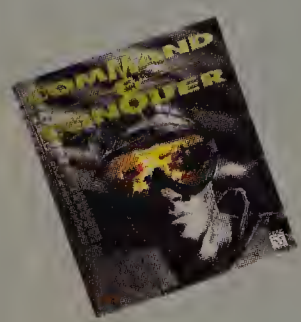

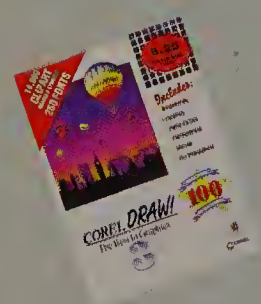

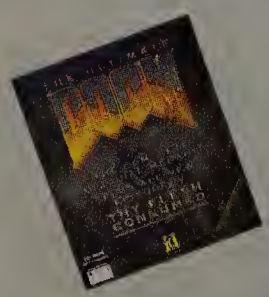

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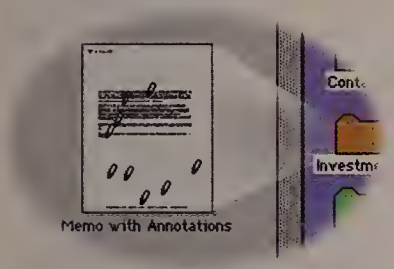

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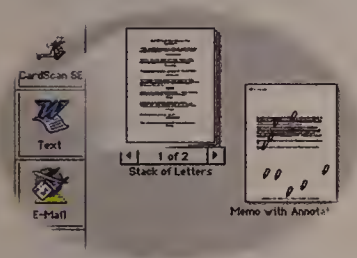

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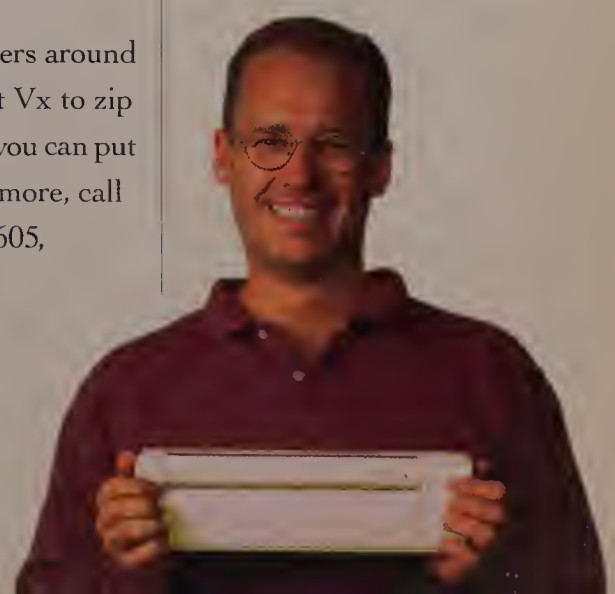

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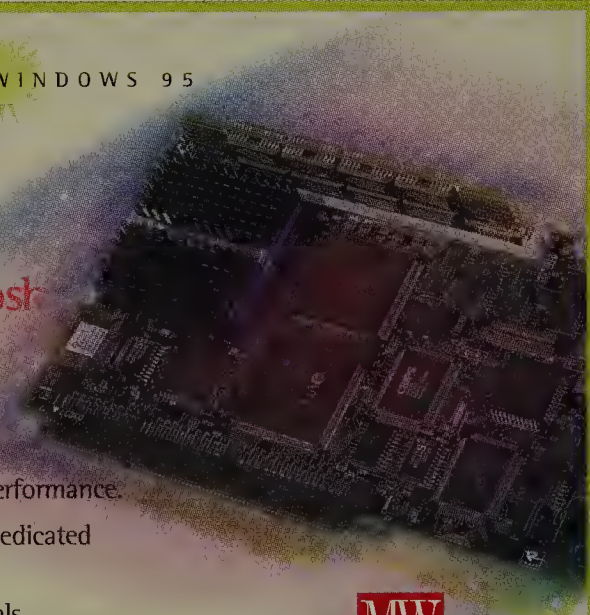

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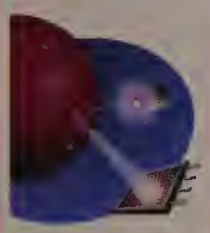

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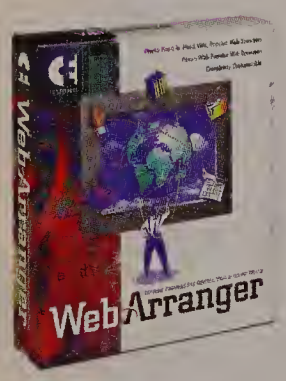

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Letters

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HAS *MACWORLD* EVER THOUGHT OF starting a weekly newspaper? I ask because the media coverage of Apple has been generally atrocious. I wanted information that I could report back to my superiors, as our company has a significant investment in Apple and its technology. So I checked *Macworld*'s Web site.

I am pleased to say that *Macworld* once again proved itself the premier Macintosh publication. Your online articles were good, solid, analytical pieces of reporting—not the sensationalist stuff I was getting from other publications.

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Turning to Telephony

I AM A RECENT SUBSCRIBER TO *MACworld* and enjoy your no-nonsense approach for those of us who are beginning Macintosh users, so I'm turning to you for advice.

I own a small, home-based business and need a telephone line–sharing device for use with my computer, fax modem, and answering machine. Are there any companies that manufacture telephone line–sharing devices?

GARY ROGERS
Somewhere in Illinois

*Several companies offer line-sharing and other telephony products. If you have an Internet connection, try Unicom's huge listing of telephony vendors on the Web (*http://www.indra.com/jewels/unicom/index.html*).*

Also try the Hello Direct mail-order company. It specializes in telephone equipment for small and home offices. You can reach Hello Direct at 800/444-3556, or visit its Web page at http://www.hello-direct.com. *For more on working out of a home office, see "Home Office Blueprint" in this issue.—Ed.*

Honey, I Fried the PowerBook

REGARDING DAVID POGUE'S SOUTHeast Asian adventures, I recognized the mysterious white lines he described that appeared on the screen of his PowerBook (*The Desktop Critic*, February 1996). I've had a similar experience with the LCD screen on my Nintendo Game Boy. Prolonged exposure to heat fries some of the liquid crystal lines in the screen—sometimes temporarily, sometimes permanently. As he described, once you're back in cooler climes, the lines may disappear (but usually not all of them). Knowing Bangkok and its hot winds, I'll bet this was the cause of those white lines. I've learned to keep my Game Boy at room temperature—it's probably good advice for a PowerBook, too.

NATHAN ALDERMAN
via America Online

PowerWave à la Carte

YOUR REVIEW OF THE POWERWAVE systems says, "If you really want a superfast hard drive, order a PowerWave with no drive and get your own" (February 1996). The only problem with this scenario is that when I checked with Power Computing, I couldn't buy a PowerWave without a hard drive. I had to get at least a 1GB hard drive—the minimum configuration. I also would have had to get the software bundle—which, I agree, contains many useful applications, but I am retiring my old Mac (a IIfx), so I either already have the titles offered in Power Computing's bundle or own an equivalent. Instead, I bought a Power Mac 9500/132 with no RAM and no hard drive. It ended up costing a little more than the PowerWave 604/132, but I got exactly the system I wanted.

MARK OHASHI
via America Online

PowerWave systems are assembled with RAM and a hard drive so that the systems can be tested prior to shipment, according to Power Computing, so you can't get a PowerWave sans hard drive or bundled software, since the software is burned onto the hard disk in the factory.—Ed.

continues

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CORRECTIONS

- *MacLinkPlus 8.06 does not support long file names in Windows 95. DataViz has no estimated date when this feature will be added ("The Windows 95 Waiting Game,"* News, *February 1996).*
- *SimCity 2000,* Macworld's *World Class finalist for games, is made by Maxis, 510/933-5630,* maxis@aol.com *("The Best of the Best," March 1996). Also, FutureWave publishes SmartSketch, our finalist for best illustration software (800/619-6193,* futurewav@aol.com*).*
- *The PaperPort Vx's resolution is 400 dpi horizontal and 200 dpi vertical (*Reviews, *March 1996).*
- *Sonnet Technologies reports the speed of its Presto 040 accelerator for the LC-class Macs as 50/25MHz "New Products,"* News, *March 1996), which we labeled as a 50MHz CPU. It in fact uses a 25MHz 040 processor.*
- *To get detailed information about Apple's software-update library, send E-mail with the appropriate subject heading (as outlined in* Quick Tips, *February 1996) to* info@thing2.info.apple.com.

OS versus OS

THANKS FOR THE COMPARISON OF THE three dominant desktop OS's ("Is the Mac Still the Easiest to Use?" February 1996). It was the first unbiased test of the Windows 95 versus Mac OS versus OS/2 debate I've seen to date. What I've found to be more important than what computer (and OS) you use, however, is how you use it. I've got Macs, PCs, and Unix boxes. They all have a purpose and they all do what they do well. The argument over what's better, the Mac or Windows 95, is a moot point. It's what works for you!

SCOTT SLAYMAN
via the Internet

I FOUND THE ARTICLE "IS THE MAC Still the Easiest to Use?" thoroughly enjoyable. The article's single largest complaint about the Mac OS is its confusing use of the Chooser to set up and target printers, whereas Windows 95 receives compliments on its desktop printer icons. In reality, the Mac OS has had desktop printer icons and one-click printer selection since System 7 Pro introduced QuickDraw GX. If the operating systems are to be compared feature by feature, it is only fair that all of the Mac OS features be included.

ROSS MORAN
via the Internet

Quality Mac

THE STORY "MACINTOSH IS STILL Quality King" came as no surprise to me, a desk editor at a newspaper with 150,000 daily circulation—230,000 on Sunday—almost all of it produced on a Mac-based pagination system (*News*, February 1996). My office machine has been in use seven days a week, often 18 hours a day, for four years. Regular maintenance and a little TLC have kept it virtually trouble-free. Keep it up, Apple.

DON BALDUF
via the Internet

I READ WITH AMUSEMENT "MACINtosh Is Still Quality King." I've been involved in the purchase of 15 PowerBook 540c's and six 5300c's. Of the 540c's, I've returned five due to defects. One 5300c was dead out of the box, and I'm sending another back to Apple as I write. I've worked on everything from Amigas to IBMs to clones to Macs, and I have never seen worse out-of-the-box quality than I have on the Macs I've purchased this last year.

KIRT THOMAS
via the Internet

GALEN GRUMAN'S REVIEW OF THE PowerBook 5300c was more accurate and balanced than other recent reviews of this product (February 1996). I've set up more than 20 PowerBook 5300c's and I find them *much* more reliable than some recent bashing would indicate.

JERRY W. TOMPKINS
via the Internet

Multimedia Man

KUDOS FOR BOTH THE NEW LOOK OF *Macworld* and Jim Heid's "Gearing Up for Multimedia" (*Media*, February 1996). I have a couple of questions for you regarding multimedia. When will *Macworld* again have a head-to-head compar-

continues

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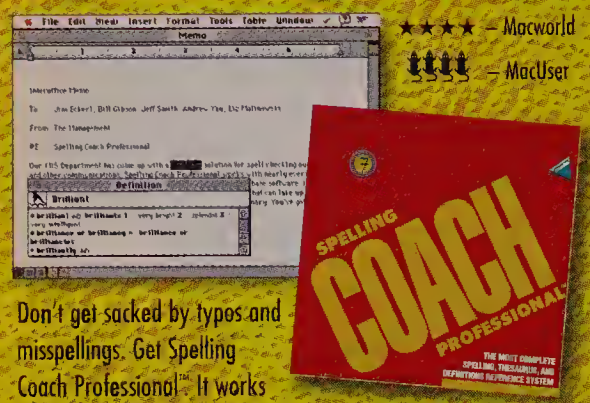

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ison of 3-D animation packages? With Macromedia's Extreme 3D, Ray Dream's Studio, and the new versions of Strata and Specular, choosing one is getting harder.

I have heard that some company, somewhere, is producing an all-in-one AV-accelerator card (for graphics, video, and 3-D) selling for less than $400. I don't know if it's NuBus or PCI. Have you heard anything about it?

KEN GOLDENBERG
via the Internet

Macworld *reviews of Macromedia's Extreme 3D, Specular's Infini-D, and Strata's StudioPro are all on the way. Our review of Ray Dream Studio appears in this issue. You can also visit several online sites for more information on 3-D graphics: the* comp.sys.mac.graphics *and* comp.graphics.animation *newsgroups,* http://www.3dsite.com/3dsite/, *and America Online's 3-D special-interest group (keyword* 3D*).*

Regarding those inexpensive all-in-one graphics cards, several companies have announced multifunction cards. Diamond Multimedia (405/325-7000), ATI (905/882-2600), and IMS (408/369-8282) expect to ship products soon. And as with the graphics programs above, watch for Macworld's *review.—Ed.*

Hey, Thanks, Macworld

TODAY I RECEIVED A POSTCARD thanking me for extending my subscription to *Macworld.* The card said you perceived my decision as a vote of confidence in your magazine.

You're perhaps even more correct than you may guess. My 7100/80AV system is centered around the Radius SpigotPower AV compression board, and it runs flawlessly, even though both the store that sold me the components and reps from Radius tried to convince me to buy something else. My system is the result of three years' worth of reading *Macworld* and following your articles. I knew the system could be made to work because, in very large part, you folks showed me how to do it.

RAYMOND KRISE
via the Internet

Find Kind File

JOSEPH SCHORR'S ARTICLE ON SYSTEM 7.5's Find File command was great (*Secrets,* February 1996). I especially appreciated the tip about accessing the old (pre–System 7.5) Find command. Why? Well, in the old Find, you could search the kind attribute by the text that appears in the list view (for example, an Adobe Photoshop document). In the new Find, it seems you can only use the type of file (document, alias, and so on) or the obscure four-letter creator or file-type designators, which can only be found using ResEdit or a disk program like Norton Utilities. Is this true?

ELIOT HOCHBERG
via the Internet

You don't have to use ResEdit or NUM to determine file type or creator codes for Find File searches—just drag a similar file onto the Find File window and the type or creator code fills in automatically. If you don't have a similar file to use as a reference, you can either use the programs mentioned above or shareware utilities that display file types and creator codes, like Rick Buck's $15 GumShoe 1.03.—Ed.

Comic Fonts

SOME MONTHS AGO, I SAW A FONT advertised in your pages that was similar to the handwritten text style used in comics. I have not seen it since. Do you have any knowledge of it?

RICK AVERILL
via America Online

Image Club (800/661-9410) sells a font called Comic Book, $25 for three styles. Another good reference for thousands of fonts, should you get stuck again trying to remember a font's name, is the $40 Precision Type Reference Guide (800/248-3668). I also searched America Online and found a few comic-book–style fonts. I particularly liked Pat Snyder's $14 shareware Comics CarToon; Dave Jacob's $10 Mastercomics (complete with KRAK *and* POW!*); and Marcel White's $10, Magic Marker–inspired Big Foot.—Ed.* m

Letters should be sent to *Letters, Macworld,* 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (*70370,702*), MCI Mail (*294-8078*), America Online (keyword *Macworld*), AppleLink (*Macworld1*), or via the Internet (*letters@macworld.com*). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld.*

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Macweek
July 24, 1995

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MacUser Magazine
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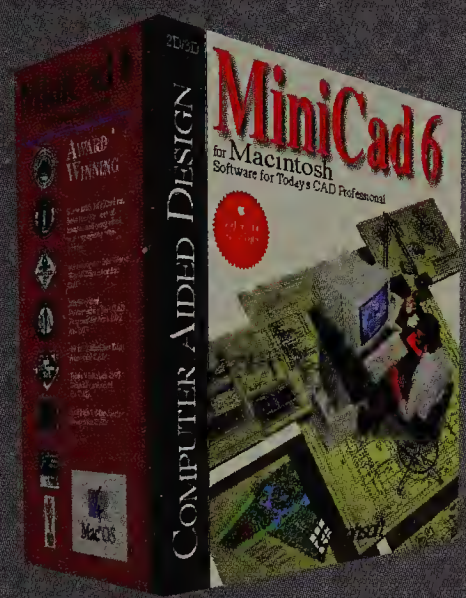

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by Adrian Mello

Someone Tell Apple the Toga Party Is Over

WHAT MAC DEVELOPERS SAY ABOUT THE FUTURE OF THE MACINTOSH

AS I WRITE THIS, GIL Amelio has been at Apple's helm barely four weeks—hardly long enough to know whether he'll be able to match past successes as a corporate turnaround champ. Still, we've already seen a few hopeful signs. For example, within a couple of weeks of coming on board as president, CEO, and chairman of the board, Amelio announced his intention to spend at least half his time outside of Apple talking to customers. That's encouraging news—Apple's former leaders tended to focus on their own technology navels rather than figure out what customers care about most.

In the context of his new duties, it's clear that when Amelio talks about customers, he refers not only to Macintosh users but also to third-party developers. By the time you read this, several leading Macintosh developers will have met with members of Apple's top management at a "CEO summit." Expect this meeting to be the first of many.

Curiously, little attention was paid to developers during the fevered weeks leading up to Amelio's appointment. Industry analysts and the general press issued gloomy moment-by-moment reports from Apple's putative deathbed, sending waves of concern through the user and stockholder communities. Yet anyone who talked with third-party hardware and software developers for the Mac, as I did, heard a far more sanguine prognosis.

I interviewed top execs at more than a dozen highly successful Mac companies. All had served the market since near the time of the Mac's inception. Some had even worked at Apple. I wanted to know two things from these veterans: Were they still excited and inspired by Macintosh technology, and what must Apple Computer do to earn their continued support for the Mac platform?

Embracing Innovation

There's no question that enthusiasm for the technology remains strong. Adam Lavine, president and CEO of Specular, says, "The Mac is a great platform. It's amazing and magic. With drag and drop, QuickTime, and QuickDraw 3D, you can run rings around an SGI system because the Mac provides quicker turnaround time on less-demanding tasks."

Developers appreciate the Mac's accessible interface and simple elegance—two signature characteristics that have helped them earn a base of loyal users who actively embrace the new. Roy MacDonald, president and CEO of Connectix, says the Mac simply provides a better user experience. Furthermore, the Mac community recognizes and supports superior quality from a small vendor. "A new company with an innovative product has a reasonable chance of success in the Mac market—not so on the PC side, where it is much harder."

Mike McConnell, president and CEO of Visioneer, agrees. "We are doing a great business on the Mac. Just because Wintel has 90 percent market share, that doesn't mean that it's a good business for third parties. We think that twice as many peripherals sell per unit on the Mac as on the PC. And for innovative new products, it may be more like five to one in terms of available customers."

According to Larry Zulch, president of Dantz Development, "Windows doesn't have the internal robustness of the Mac. We want to do quality products on Windows, but the shoddy architecture of the Wintel platform makes this extremely difficult. You end up doing products that only have 80 percent of the value of a Mac equivalent. To add that extra 20 percent takes twice the work."

Paul McGraw, executive VP of APS, says providing for the Intel platform's multiplicity is dicey: "The wide variety of CPU and card architectures in the market—the Wintel legacy—makes developing for and supporting that market difficult." Plus, he adds, "the satisfaction of working in the Apple environment just isn't there."

Focus, Follow Through

Many industry observers talk about the challenge of keeping developers associated with the Mac as if it were a matter of fighting religious apostasy. Developers will tell you they're just looking for an effective way to manage their businesses. They'll go where they can make money.

Superior technology, a less diffuse marketplace, and a responsive customer base should make the Macintosh platform fertile soil for growing successful businesses. And yet, according to developers, something's missing. All call on Apple to *focus*, *follow through*, and *make hard choices* about its own research and development. As Duane Schulz, president and CEO of Now Software, puts it, "If I were Gil Amelio, I would put up a banner

continues

across De Anza Boulevard that says 'The Toga Party Is Over.'"

Graphsoft president Richard Diehl and Farallon president and CEO Alan Lefkof echo Schulz's sentiments. "Make a list of the ten most strategic technologies," Lefkof recommends. "Then list another 25 items that aren't strategic and cancel those projects. . . . That is the kind of decisiveness that would come from a professional leader."

"Engineers need to be managed," Diehl concurs. "You can't give people unaccountability as a perk. Apple employees are mistakenly encouraged to move on to new projects rather than improving and evolving existing projects."

"After introducing technology, they decrease the size of the engineering team to maintenance and take the evangelists off of it," agrees Schulz, who once worked at Apple. The company's fascination with the new and whizzy often led it to abandon technologies once they were out of the labs, instead of nurturing and developing them. Apple needs to decide which technologies are fundamental to its mission and pursue them with focused energy.

Amelio understands this. "[T]o support creativity and raise standards," he says, "you have to be prepared to kill a lot of projects. Just as nature throws off many variations and experiments that don't succeed, so must the transformation manager." In fairness, even before Amelio's arrival, Apple had begun to pare down, dumping Taligent, Kaleida, and PowerTalk. Many developers now think Amelio should expand the hit list. It's worth noting, though, that in early March Amelio announced that Apple would discontinue its Johnny-come-lately online service, eWorld. "Does the world really need another computer online service?" he asked.

Know Thyself

Charlie Oppenheimer, another Apple vet, now vice president and a general manager at Global Village Communication, advises Apple to "determine what your brand stands for and execute that better than anyone else. The Apple brand is about ease of use and content creation." Apple's core strength rests in software innovation, so that's where the company should focus. "Apple can't define hardware standards," says Connectix's MacDonald, "but it is producing some of the best OS extensions out there, such as Open Doc, QuickTime, and QuickDraw 3D."

Mark Zimmer, chairman and CEO of Fractal Design, agrees: "You find a standard first on the Mac and then it appears elsewhere six months later." He believes Apple should play a key role in improving the standards on the Net. "Browsers really seem clunky when you're accustomed to the Mac interface."

McConnell suggests Apple conceive of its research and development budget as the total of its own R&D budget *plus* those of its third-party developers. Having fewer irons in the fire will permit Apple to concentrate its efforts.

Developers appreciate Apple technology and enjoy producing for the Mac community. Still, they know better than to hitch their wagons to just one horse. All recognize the necessity of competing in a cross-platform marketplace. The loyalty of its customers will not by itself bring back Apple's halcyon days. But if Amelio leads with focus and discipline, as Oppenheimer says, "Great things can still happen." m

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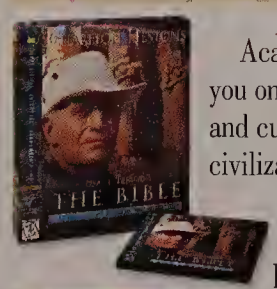

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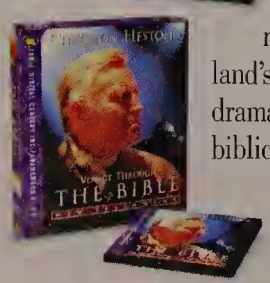

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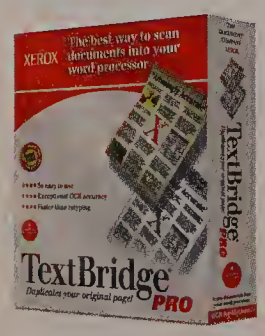

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Circle 100 on reader service card

by David Pogue

Microsoft Word Six-Point-Oh-My-God

ELEVEN ILLUSTRATIONS THAT MICROSOFT HAS LOST ITS MIND

IN RETROSPECT, IT'S REALLY not so hard to imagine the conversation that took place in Microsoft's high-level boardroom about two years ago. "Ladies and gentlemen," begins somebody in a suit, "it's time to upgrade the best-selling Macintosh word processor. What features shall we add?"

"Jeez," complains a programmer. "Didn't we just go through this with Word for Windows?"

Suddenly everybody sits bolt upright. "Are you thinking what I'm thinking?" says the suit guy.

Pandemonium. A ponytailed kid shouts: "Yeah! Let's just hack the Windows version so it runs on the Mac!"

The accounting rep: "Yeah, that'll be much less expensive than actually expending thought or effort."

And so it was that Microsoft Word 6.0 was born: a gargantuan, 25-megabyte, strange-looking monstrosity that runs with the speed of an anesthetized slug.

But you know about Word 6's lethargy and obesity. What gets me, though, is how many great Word 5 features Microsoft *took out*. Seems to me that when you introduce a new version, you should add features, not eliminate them.

Let us take a moment of silence to mourn the passing of the handy features of Word 5. May they rest in pieces.

The Font Menu

A Macintosh word processor without a Font menu? Isn't that a fundamentally flawed concept, like a rock group without drums? In Word 6, if you decide to change the font, you're supposed to aim the mouse at the microscopic triangle button on one of those irritating tool bars. Of course, if that tool bar isn't on screen, and you don't know the keystroke for opening it, you can't change your typeface at all. Hope you like Helvetica.

And speaking of fonts—Microsoft claims that excessive fonts and extensions are responsible for the program's sluggishness. I love that! They're implying that Word's slowness is *our* fault!

So if fonts and extensions are so evil, how come Word 6's own installer dumps 16 of them into the System Folder?

Spaces in Menu Commands

If you confront the Customize dialog box, as you must if you want to change a keystroke, you discover that all the menu commands are called things like MailMergeEditSource. Ditto when you're working with macros: no spaces. Hey, Microsoft: it's called the spacebar. Use it.

Limitless Menu Customizing

The Word 6 advertising would have you believe that its menus are as flexible as Silly Putty. But in some respects, Word 6's menus are *less* customizable than Word 5's. At least in Word 5 you could add *anything* to a menu. You could open the Preferences dialog box, press ⌘-option-plus, and click the Smart Quotes check box. Instantly, the Smart Quotes command would show up in the Tools menu. Thereafter, when you needed straight quotation marks (to indicate feet, inches, or degrees, for example), you could choose that command to switch off the automatic quote-curling feature. Other useful menu-addable commands: Background Repagination, Fractional Widths, Show Picture Placeholders, and so on.

In Word 6, the only commands you can put in your menus are the ones that appear in its minuscule Commands dialog box—that endless scrolling list of Geneva 9-point type with no spaces between words. And guess what? Some of the most useful commands, like Smart Quotes and Fractional Widths, simply aren't there. (Microsoft cheerfully suggests you write a macro to achieve the same purpose. Terrific.)

Redefine Style Command

Style sheets are among humankind's greatest inventions. They let you apply all kinds of fancy formatting—font, style, size, color, paragraph spacing, and other stuff—to selected paragraphs with a single keystroke. Better yet, to modify a style you just change any one paragraph; a single command —called Redefine From Selection—applies that change to all the other paragraphs in that style. Cool!

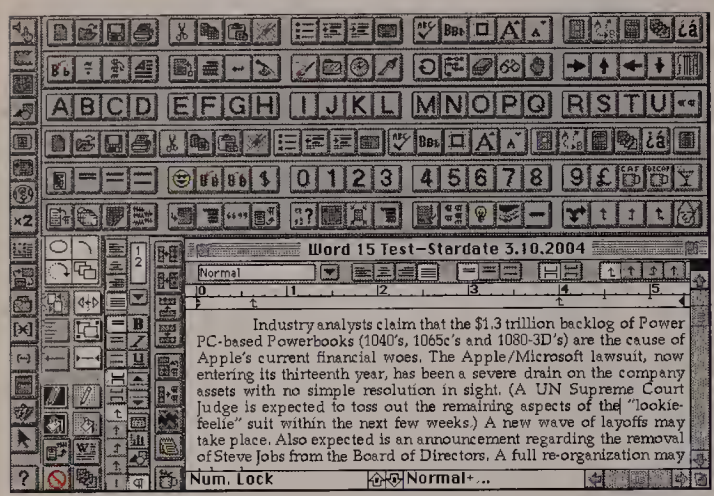
Well, it *used* to work that way. Microsoft's engineers took that command out of Word 6. They've given us several longer, clunkier methods to do the same thing—but why?

Select Style by Abbreviation

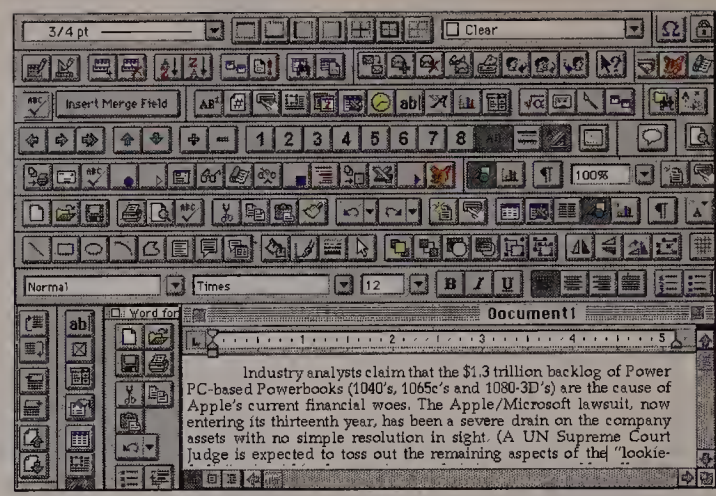
In both Word 5 and 6, you can choose a style without ever taking your hands off the keyboard. In version 5, you just press ⌘-shift-S, type a few letters of the desired style's name, and press return. Bingo—the selected paragraph takes on the new style.

In Word 6, you *can't* type just the first few letters. You have to type out the *entire*

continues



The Once and Future Word In February 1994, a satirical screen shot (left) appeared in this column, bearing the caption "Word 15."



Nine months later, Word 6 arrived (shown at right). Hey, Microsoft—it was supposed to be a joke! A joke!

name—"Subhead bold," or whatever. Otherwise, you only define a new style whose name is the abbreviation you typed. The Style menus of former Word 5 users are filled with accidentally generated styles: Su, Subh, Subhead Bo, and so on.

Window-Splitting Intelligence

If while typing page 50 you want to refer back to page 5, you can split your window. Once split, your window has two panes, each with its own scroll bar. In Word 5, when you then *unsplit* the window by double-clicking the split bar, you were back on whichever page contained the cursor—perfectly logical.

This system has been reversed in Word 6. Now, when you unsplit a window, you're deposited on whichever page *didn't* contain the cursor—perfectly illogical. In other words, you're forced to scroll manually all the way back to page 50.

Tab to Search for Something Else

Suppose you're looking for fun. You press ⌘-F. The Find box appears. You type *fun* and press return. Word starts finding too many occurrences, so you change your mind: "Maybe I'll look for love instead."

Now, in Word 5, you could have just pressed the tab key to highlight the Find What box, then typed *love*. But that one's gone from Word 6, too; to replace what's in the Find What box, you're forced to use the silly old mouse to highlight the entire box before you can type your new search word. This is progress?

Screen Test

You remember Screen Test, don't you? It was a fabulous secret screen saver in Word 5. You could only get to it via Commands—although you could easily install it in a menu from there. Once invoked, it would fill your screen with dazzling geo-

continues

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metrical After Dark–type displays.

The Microsoft No Fun Committee must have found it; Screen Test is gone.

Customized Point Sizes

Used to be that in the Character dialog box you could type any weird type size you wanted—13-point, 30-point, 60-point, whatever. Then, by pressing ⌘-option-plus and clicking on what you had typed, you could add those sizes to your Font menu for future access.

Of course, since there's no Font menu anymore, you can't specify any nonstandard point size in Word 6 without having to open and wait for the Font dialog box and type in the number—every time.

The Left-handed Delete Key

The placement of the delete key on the Mac keyboard is illogical. About 90 percent of us are right-handed; when editing, we use that hand to grab the mouse, click, press the delete key, go back to the mouse, and so on. Wouldn't it be nice to have a left-side delete key? You could then use both hands—click, delete, click, delete—and move along far faster.

Well, in Word 5, you could assign the delete function to the escape or tilde key and cruise along with your dual delete keys. In Word 6, you can't reassign the delete command at all.

Free Page-Number Placement

In Word 5's Print Preview mode, you could actually drag the little page number around on the miniature representation of your document's pages, experimenting with its placement by eye.

"Not boring enough," the Microsoft focus groups must have said. So the noble programmers removed that drag-it-around feature, forcing you to specify where the page number goes by typing numbers into a dialog box.

The Upshot

I know Word 6 has its fans. I met both of them at Macworld Expo. I'm sure they'll fill my E-mail box, pointing out how I can use the MailMergeEditSource command, or whatever, to make a macro that simulates one of these omitted features.

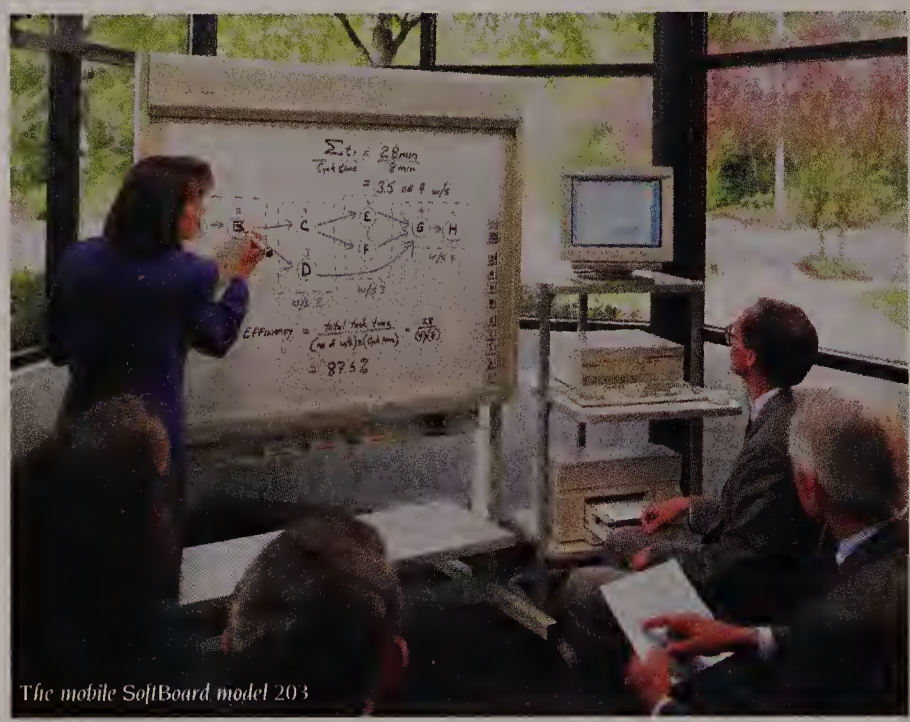
But actually, I'm concerned with Microsoft. In confirming the deletion of the nice touches described, I spoke to the incredibly pleasant Word 6 product manager. He admitted that a few things—especially the infuriating Customize dialog box—could have been done better. But he said that most of Microsoft's software sales are to big corporations, where it's a high priority to have a program look identical on Mac and Windows. If Microsoft's logic is to be believed, the decision to make Word into a Windows program is good because it makes it OK to have Macs in corporate offices.

Fine. But we chose the Mac precisely *because* it's superior to Windows, and we'll miss the friendly customizability of the real industry standard, Word 5.

The Word 6 product manager's comment about my column topic: "Well, I hope you can find *something* nice to say about Word 6."

But of course—Word 6 has done wonders for RAM and hard-drive sales. m

Contributing editor DAVID POGUE is the author of *Macs for Dummies*, fourth edition (IDG Books Worldwide, 1996). He wrote this column in WordPerfect.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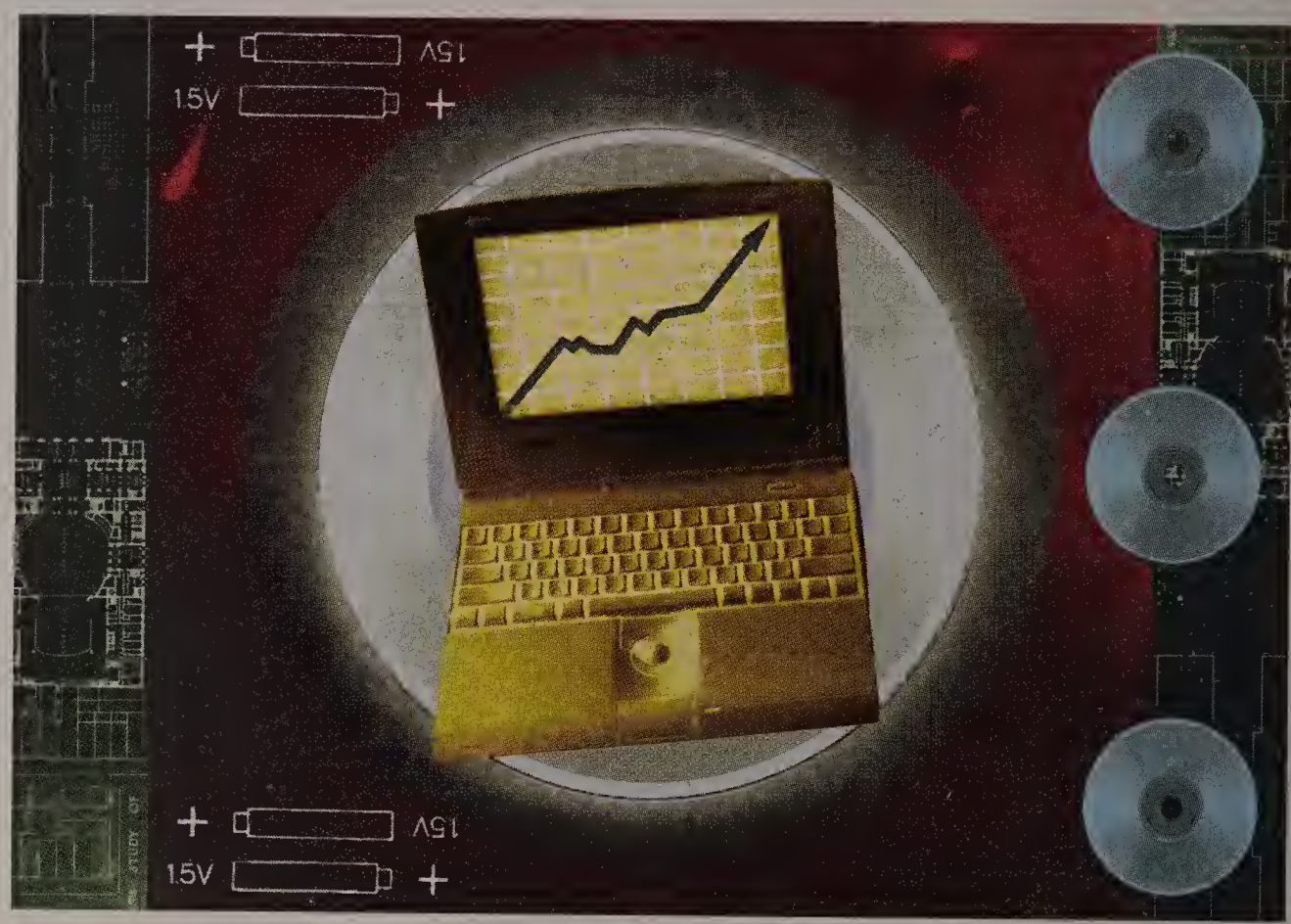
News

systems

New Notebooks, Desktops on Horizon

NEW POWERBOOKS WILL TRY TO REGAIN APPLE'S NOTEBOOK GLORY

by Cary Lu and Galen Gruman



FRANCISCO CACERES

Now that the transition to PowerPC is complete and the PCI bus is implemented in all desktop business Macs, what's left for Apple to deliver? The short answer is the PowerPC Platform (the Apple-IBM-Motorola design formerly known as CHRP) running the Mac OS, but an Apple system based on this design is not expected until this autumn at the earliest—industry insiders say winter or spring 1997 is more likely, coinciding with the release of the Copland version of the Mac OS. Apple has demonstrated an IBM PowerPC system running the Mac OS, but no Apple system. The PowerPC Platform will also run Microsoft's Windows NT, Sun's Solaris Unix variant, and IBM's AIX Unix variant. (IBM has effectively killed OS/2 for PowerPC.)

In the meantime, Apple is focusing its energy on a revamped PowerBook line that it hopes will reinstate the Mac notebook's reputation as a leading-edge portable (after the ho-hum reaction to the PowerBook 5300 series), and on a new line of Performa tower systems. Apple would not comment on its planned systems, but *Macworld* has obtained documents describing them. Because the products are in development, release schedules and feature sets may change.

PowerBook Renaissance? Apple's PowerBook plans for the year have several stages.

First CD PowerBook First will come the moderately priced series, code-named Epic, that boasts a completely new design. Some Epic models will be the first PowerBooks with a built-in CD-ROM drive that can take standard-size CDs. The Epic will not have any internal parts interchangeable with the 5300 series, aside from PC cards; its bays for storage devices and batteries will require a different shape. The PowerPC 603e-based Epics will replace the 68040-based PowerBook 190 series, but because all Epics will come with a color screen, Apple plans to keep the gray-scale

version of the PowerBook 190 (the 190cs) available for several months after the Epic series' introduction in July.

150MHz Design Beyond the Epics, another new PowerBook series, code-named Hooper, should debut at the end of this year or possibly early next year. Hooper will initially come in a 133MHz model with an external cache; 150MHz models are likely to appear later. As is true for previous PowerPC PowerBooks, the Hooper series will use the PowerPC 603e CPU.

Hooper has a completely new motherboard design,

continues on page 41

systems

Motorola Signs Mac OS License

TARGETS ENTERPRISE MARKET, CHINA

by Charles Piller

Apple Computer has licensed the Macintosh Operating System to the Motorola Computer Group, the computer-system maker for Motorola. Motorola's license, announced February 19, also includes the current Macintosh hardware platform, though Motorola declined to state if it would offer Mac clones based on today's hardware design. The license covers System 7.5.X (including all local-language versions) and Apple's next major system release (code-named Copland). The agreement contains no restrictions on markets, models, or geographic regions, according to Apple and Motorola.

Motorola—codeveloper of the PowerPC chip family and the forthcoming PowerPC Platform (also known as the Common Hardware Reference Platform, or CHRP)—is the first Macintosh OS licensee with authority to sublicense the Mac OS to other manufacturers. These manufacturers could then differentiate their products without having to get permission from Apple. This arrangement differs from previously announced licenses, which allow clone makers to supply systems or system boards to other vendors, but only for resale without modification.

Motorola's arrangement represents the beginning of a broad licensing program based on CHRP, says Apple CEO Gilbert Amelio. "This is a significant step because it makes the whole process more flexible and allows us to move ahead more quickly," Amelio says, emphasizing Apple's current commitment to open OS licensing based on CHRP.

Apple's original OS licensing strategy, announced in late 1994, was also based on the idea of open and broad licensing. But the company shifted gears—fearful of competitive pressures that could erode its bottom line and daunted by the logistical difficulties of supporting many licensees on today's proprietary Mac hardware design. Thus Motorola joins a group of only four licensees—Power Computing, Umax, DayStar Digital, and Pioneer. And although Motorola is a major chip maker and a telecommunications giant, it is not a significant player in the PC market, in which Apple will ultimately need to increase the Mac OS share significantly.

By licensing the Mac OS now, Motorola hopes to get a jump on as-yet-unknown competitors selling the Mac OS, but it did not announce any timelines for product releases. However, Joe Guglielmi, general manager of Motorola Computer Group, indicates that his company would not ship any CHRP systems until all the OS's supported by the platform—including the Mac OS, Solaris, and Windows NT—were up and running.

Guglielmi says Motorola will emphasize "best-of-class" systems and motherboards for its Mac OS–based offerings, a posture that seems to place it in direct competition with Apple, which recently announced a similar strategy. But Guglielmi says that Motorola will primarily target two of Apple's historic weak spots—the enterprise market and China: "We're almost exclusively focused on the enterprise, and we have no plans to put Motorola-branded products into the retail channel." Guglielmi adds that Mac laptops will not be among the initial offerings.

MACWORLD EXCLUSIVE

Umax Clone Speeds to Top of Mac Pack

FIRST LOOK AT SUPERMAC PROTOTYPE

by Charles Piller

Tests by Macworld Lab of the first clone from Umax Computer (408/327-4900, *info@supermac.com*) suggest that the Mac market will soon have a formidable new competitor. The company's prototype placed ahead of competing products (see the benchmark, "Umax Clone: The Fastest Mac, for Now"). Umax acquired the Radius Mac-clone business in January and expects to release its first Mac under the SuperMac label this spring. Judging from the

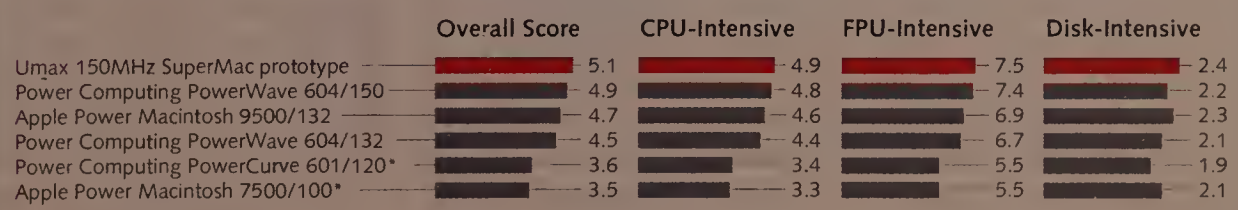
continues

MW LAB

Umax Clone: The Fastest Mac, for Now

Best result in test. Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0).

With a third major player in the Mac clone market, Mac buyers may begin seeing competition based on speed. For example, Power Computing beats Apple in single-processor PowerPC 601–based systems, while Apple beats Power Computing in 604-based systems. But the new kid on the block, Umax, so far beats them both, in both categories. For details on Macworld Lab's system testing, see "The Best Mac for the Job," February 1996.—Macworld Lab testing supervised by Mark Hurlow



*With optional 256K cache.

machine's speed and its expected retail price of about $4000, the clone should compete well against similar offerings at the top of the Apple and Power Computing product lines.

The Umax machine features the 150MHz PowerPC 604 processor—currently the fastest on the Mac market. The machine will include slots for two CPUs, but Umax does not expect to ship its multiprocessor software or make the second CPU card available until sometime after the base product ships. Peter Mehring, vice president and general manager of Umax, says that the company expects to satisfy the low end of the multiprocessor market—users who want some speed improvements, but who only want to spend about $1000 above the base price, rather than paying $15,000 to $20,000 for DayStar Digital's four-processor workstations.

The machine showed superb compatibility with a wide range of Mac applications and peripheral devices. It may have achieved its slight speed superiority over the Power Computing PowerWave 604/150 by exploiting memory interleaving.

The Umax clone will ship with 16MB of RAM (upgradable to 1GB), a 512K cache, a 4× CD-ROM drive, six expansion bays, and six PCI expansion slots. Umax also plans to offer Ultra SCSI drives and, eventually, a combination 100-Mbps Ethernet and Ultra SCSI I/O card as options.

Umax should release a more modest business system, in the $2500 price range, shortly after it ships the initial unit, then follow this summer with a consumer model for about $1600. Mehring says that Taiwan-based Umax will be able to live with the low margins these prices imply by exploiting its low-cost manufacturing capacity in Asia.

systems

Toss Those System 7.5 Patches

VERSION 7.5.3 BRINGS TOGETHER FIXES

by Galen Gruman

Confused by all the System 7.5 patches? You're not alone. Apple has now issued System 7.5.3, an update to the Mac OS that consolidates the various patches and model-specific versions from the past year into one general release that works on all Macs.

The free update is available from Apple's Web site (*http://www.info.apple.com*). You can also get a CD copy for $13 from Apple's sales group (800/293-6617, ext. 984). Macs that ship this spring will come with 7.5.3, and the retail System 7.5 package in stores will be updated this spring as well.

One of the biggest changes in System 7.5.3 is the inclusion of Open Transport 1.1, a bug-fixed version of Apple's new networking architecture. Open Transport works on all Macs using the 68030, 68040, and PowerPC CPUs. Users of 68000 and 68020 Macs continue to rely on the old networking architecture—the installer knows which of the two networking architectures to install.

Among the fixes in Open Transport 1.1 is compatibility with 100-Mbps Ethernet, redial support, broader compatibility with SLIP and PPP options, better performance on servers, and the repair of a bug that prevented Apple Remote Access users from printing to local printers when connected to an ARA server.

Apple is also including the developers' release of OpenDoc, its systemwide plug-in architecture. This should begin to establish OpenDoc as a standard system component so developers can start offering OpenDoc-based tools.

Apple says more of System 7.5.3 is PowerPC native, which should boost performance in some tasks. Users of Microsoft software will find that Word 6.0 and Excel 5.0 load faster, thanks to changes in System 7.5.3's virtual-memory manager to get around flaws in Microsoft's code.

One thing you won't see in System 7.5.3 is PC Exchange support for Windows 95's long (250-character) file names. You'll continue to see the truncated DOS names (like DOCUMENT.DOC).

utilities

Now Showing: Phrase Macro

NOW UTILITIES 6.0 ADDS AUTOMATIC TYPING, ICON BARS, SHORTCUTS

by Howard Baldwin

Devotees of the shareware utility TypeIt4Me, which automatically generates frequently typed phrases, might want to check out a similar capability called AutoType in Now Software's (503/274-2800, *info@newsoft.com*) Now Utilities 6.0. The new version, scheduled to ship by April, also adds components called Tabs and Shortcuts.

With AutoType, you can set up macros for commonly used phrases (such as Internet E-mail signatures), or you can let the software track what you type and identify phrases you use on a regular basis.

Tabs saves screen real estate by creating a bar at the bottom of the screen; you can reduce applications or files to rectangles in this bar, so you can easily launch or reopen them. Shortcuts simplifies the Duplicate, Delete, and Make Alias commands for files and folders.

industry

Right-Hand Man Follows Amelio

NEW APPLE CEO ALSO HIRES A NEW TREASURER

by Cameron Crotty

Gilbert Amelio, chairman and CEO of Apple Computer, has hired George Scalise to be executive vice president and chief administrative officer of Apple, effective March 11. Scalise served under Amelio at various positions for just under five years while the two were at National Semiconductor. Amelio also hired Fred Anderson as Apple's new chief financial officer.

Scalise An Apple spokesperson said Scalise's precise duties had not been fully defined at press time, but that his responsibilities would be similar to those that he had at National Semi. In his most recent post, executive vice

president and chief administrative officer, Scalise managed human resources, corporate services, legal affairs, business development (including licensing and alliances), intellectual property, strategic planning, industry affairs (including government relations), and investment planning. In short, according to a National Semi spokesperson, Scalise handled nearly everything that was "not the direct, day-to-day running of the company."

Scalise is "someone that Gil [Amelio] felt comfortable working with," and who could serve as a "right-hand man" to Apple's top executive, says Greg Sheppard, an analyst who follows the semiconductor industry for Dataquest. Sheppard emphasized Scalise's credentials as a strategic thinker.

Given Scalise's record in the semiconductor industry, he may also provide Apple with some much-needed negotiating talent as the company continues to try and collect allies in the battle to create a Mac-clone market.

Anderson Apple's new CFO, Fred Anderson, has a reputation for helping companies get a handle on their inventory and financial problems. Before joining Apple, Anderson had been CFO of the payroll-processing giant Automatic Data Processing. He previously helped restructure MAI Systems, a computer systems company.

In announcing Anderson's appointment, Amelio said, "He has a very impressive track record for managing assets, financial growth, and restructuring activities."

Anderson replaces Joseph Graziano, who left Apple in October 1995 after a fallout with former Apple CEO Michael Spindler; Graziano had been urging that Apple merge with or be acquired by IBM.

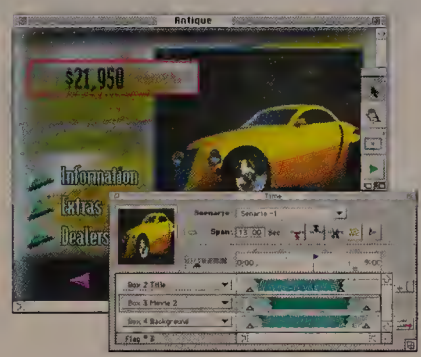
multimedia

Scitex Moves to Multimedia

HAS STRONG DATABASE SUPPORT BUT LIMITED ANIMATION ABILITIES

by James A. Martin

Continuing its attempts to diversify beyond its high-end image-workstation business, Scitex (617/275-5150) plans to release in May an object-oriented multimedia-authoring program for a street price under $1000. The multimedia-authoring market has grown hotly competitive in recent months,



Scitex's ClickWorks lets you choreograph events on a timeline; do logical scripting; and set attributes such as text styles, colors, and blends.

with the release of mTropolis's mFactory and planned releases of Macromedia Director 5 and QuarkImmedia.

ClickWorks Preview The Scitex entry, ClickWorks, will differentiate itself with strong database ties, the company says. ClickWorks' support of Microsoft's ODBC protocols should let you easily integrate ODBC-compliant external databases into a ClickWorks presentation. A retailer could create a catalog in ClickWorks for its Web site, for instance, letting users gain up-to-the-minute product information online from a linked database.

continues

Media WATCH

BY JAMES A. MARTIN

The Web Presses On Scitex America (617/275-5150) brings new meaning to the term *web press* with its Scitex Internet System 10, designed to let publishers transmit large graphics and page-layout files to prepress vendors via the World Wide Web. For $39,000, you get an Apple Internet Server 9150, complete system setup and maintenance, on-site training, a Web site, the necessary communications and routing hardware, a dedicated 56-Kbps telephone line, and Scitex's NetDog software.

When your files are ready for output, drag and drop them into NetDog envelopes; the software automatically generates HTML thumbnails of the files and posts the thumbnails on your Web site. Using a password, your prepress vendor can retrieve your original files separately or in batch mode by clicking on the appropriate Webpage thumbnails. The files are then transferred over the 56K line. The Internet System 10 is also for companies that want to make content such as software utilities available to Web surfers for downloading.

Fast Photos for Fewer Bucks Digital cameras aren't exactly famous for their low prices—some models cost as much as a luxury Lexus. But there's good news at last: the Epson America (310/782-0770) PhotoPC is expected to be the first digital camera for the Mac with a street price of $500 (the list price is $589). The PhotoPC, due to ship in May, captures 24-bit color images at two settings—high resolution (640 by 480 pixels) or standard (320 by 240 pixels)—and stores up to 16 high-res images in 1MB of flash memory. Storm Software's EasyPhoto image-management software is included.

VideoVision Boards the PCI Bus Radius (408/541-6100, *support@radius.com*) has announced a PCI bus version of its venerable VideoVision digital-video card. VideoVision Studio PCI, expected to be available in March for $3500 to $4000 (pricing wasn't final at press time), promises all the features of its NuBus sibling along with a few extras: faster video capture and display; 16-bit, 48kHz audio that's completely synced to video clock rates; and an improved encoder-decoder for enhanced image quality. Radius also cut prices up to 38 percent on its NuBus VideoVision Studio and Telecast products.

DOUG ROSS

ClickWorks' open architecture lets third-party developers add extensions, such as a Scitex plug-in that translates text into voice narration. The program also offers text-editing and design tools, such as copyfitting within objects and the creation of antialiased text.

Unlike Macromedia Director and other authoring programs with robust animation tools, ClickWorks supports only box animation—the ability to cause an object to move across the screen.

Broadened Product Line ClickWorks is the latest in a series of products and services under development that fall outside Scitex's traditional image-workstation business. Just recently, Scitex announced the Scitex Internet System 10, which lets publishers transmit files to their prepress houses via Web pages (see "Media Watch," in this section). At the same time, Scitex's proprietary image-editing workstations are experiencing heated competition from nonproprietary, high-end image-editing systems such as Live Picture's Live Picture Network (see "Live Picture's Network Version Debut," in this section).

Scitex's recent change in product direction could be seen as an effort to make the company less dependent on a core technology whose dominance is steadily diminishing.

KEVIN CANDLAND

A Truly Portable Projector

Do you reach for a back brace or luggage cart when you take your presentation on the road? Try this on for size: Light-Ware's (503/641-7873) $6500 Viewpoint LCD projector. At just 9.4 pounds and with a dainty 12-by-9-inch footprint, the Viewpoint sets up in a flash—just pop up the lens, plug the projector into a Mac or PC, and go. You don't even have to dim the lights; the Viewpoint worked fine for me in a room in which it was bright enough to read without straining.

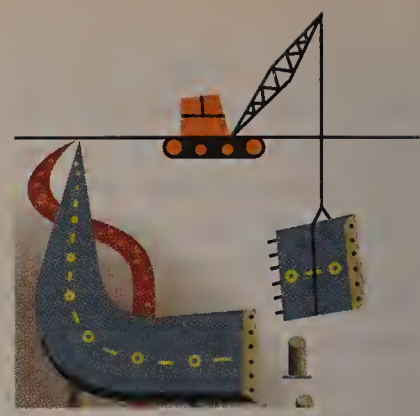
Remote-control extras like an on-screen pointer and curtain feature, plus zoom and freeze-frame, are a welcome touch. The Viewpoint's price is right, and the light weight is heavenly.—SUZANNE COURTEAU

storage

Ultra SCSI Arrives

THE TRANSITION BEGINS TO NEW DRIVES AND NEW ADAPTERS

by Howard Baldwin



Stand back: a deluge of new SCSI choices is starting to flow into the market, encompassing increases in speed on one hand and maximum distance between devices on the other. New Ultra SCSI adapters and drives are now available that claim to double data-transfer rates for today's SCSI devices. Thanks to doubled clock rates in SCSI chips, you can get a potential burst rate of up to 80 MBps on Fast-and-Wide SCSI devices and of up to 40 MBps on Fast SCSI devices.

Two Flavors Ultra SCSI adapters will come in two flavors—a single-channel type for attaching up to 15 devices, and a multichannel type for attaching up to 30 devices. The adapter vendors are split on pricing strategies: some, like Adaptec (408/945-9600) and QLogic (714/438-2200), plan to offer new Ultra SCSI adapters at the same price as their current adapters (starting at around $250, with top-of-the-line cards costing about $500); other vendors, such as Atto (716/691-1999), MicroNet Technology (714/453-6100), and FWB (415/325-4392), expect Ultra SCSI adapters to cost from $50 to $100 more initially, with the price difference eventually disappearing. Multichannel adapters will start at about $550, with top-of-the-line cards costing about $1200.

According to vendors, Ultra SCSI drives will also cost about the same as current drives. However, you won't get the speed boost without a compatible Ultra SCSI adapter. (The Ultra SCSI drives will work with today's SCSI connectors and cards.)

The Differential Difference Come April, you'll also see a new cabling technology called differential SCSI becoming available on the Macintosh. With its noise-reduction capability, differential SCSI lets you extend the distance of your SCSI chain from 9 feet (for 1 to 4 devices) to 75 feet (for up to 15 devices).

However, you won't get this distance boost with new Ultra SCSI differential devices, only with Fast-and-Wide differential SCSI devices.

systems

Apple's Pentium Macs

HIGH-SPEED DOS CARDS ON HORIZON FROM REPLY, ORANGE MICRO

by Howard Baldwin

Macintosh users who need to run Windows applications will have more platform options in the future, based on Apple's development of two PCI-based DOS compatibility cards, each outfitted with 100MHz Pentium-class processors.

continues

DOUG ROSS

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Circle 288 on reader service card

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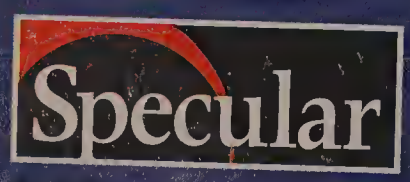

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Circle 41 on reader service card

Apple's (408/996-1010) current DOS Compatibility Card works only in the Processor Direct Slot of the Power Macintosh 6100 and Performa 6100.

One card would be outfitted with a less-expensive 100MHz Cyrix 586 CPU (whose performance is similar to a 90MHz Pentium and a 120MHz PowerPC 601), and would cost about $740 (the price of the current Apple DOS card); the other card would use a 100MHz Intel Pentium CPU and cost about $1100, offering performance similar to a Power Mac 8500's 120MHz PowerPC 604.

The new PCI card uses the same software as the current card, although Apple is still working on NDIS and ODI drivers for file sharing under Windows 95 and Windows NT. Apple will not include DOS or Windows, since it and Microsoft could not agree to a license. A ship date for the cards has not yet been set.

Other Companies' Plans The two other companies that offer DOS cards—Orange Micro (714/779-2772) and Reply (408/942-4804)—plan to add PCI products as well. Orange Micro had expected to ship its PCI line in August 1995, but engineering difficulties have delayed the cards until this spring. Reply also expects a spring release of PCI-based DOS cards. Both will support Windows 95 (as do Orange Micro's current NuBus-based cards and Reply's current PDS-based cards.)

For now, PCI Mac owners have only one choice to run Windows software on their systems: SoftWindows 2.0 from Insignia Solutions (415/694-7600). Macworld Lab tests show that SoftWindows 2.0 runs at about a seventh the speed of a 90MHz Pentium system. A Windows 95 version is due this summer.

graphics

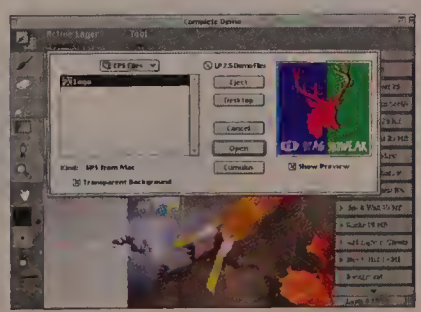
Live Picture's Network Version Debut

IT RELIES ON UNIX FOR THE HEAVY LIFTING

by James A. Martin

Live Picture is coming to a network near you. Live Picture (408/464-4200, *support@livepicture.com*) has shipped an integrated set of software tools that lets a Silicon Graphics Indy workstation relieve a networked Macintosh of Live Picture's most resource-consuming tasks, such as final-image-file rendering and PostScript rasterizing. (Formerly distributed in North America by MetaTools—formerly named HSC Software—Live Picture is now handled by the company that developed it, Live Picture.)

With the Live Picture Network software, a graphic artist rotates, distorts, and edits an IVUE-formatted image in Live Picture on the Mac, as always (IVUE is Live Picture's proprietary image-manipulation file format). But a Unix-based, multitasking Indy workstation, not a Power Mac, handles the processes of converting graphics files to IVUE; rendering final, edited graphics in Live Picture's FITS format or as PostScript files; accessing and storing FITS and IVUE files; and performing OPI conversions.



Live Picture Network relieves your Mac's rendering burden.

Live Picture Network's file-sharing capabilities, coupled with the image-editing program's routine of breaking a large file into separate tiles, let multiple artists work on different aspects of the same image simultaneously. Live Picture Network software works over any AppleTalk-compatible network. In addition, the OPI module includes a plug-in that lets users import IVUE files into QuarkXPress for creating for-position-only graphics.

Live Picture Network's prices will start at $54,500, which includes 20 user licenses plus the server software for rendering. Indy workstations start at $15,000.

networking

Apple Brings Back Unix

AIX-BASED SERVERS INCLUDE APPLETALK SUPPORT BUT DON'T RUN THE MAC OS

by Mel Beckman

A year ago, Apple (408/996-1010) killed its A/UX Unix variant, forcing Mac-based Unix users to use the discontinued operating system or switch to Tenon's MachTen Unix (see "Through the X Window," in this issue). Now Apple is back in Unix, although with IBM's AIX version. (The servers do not support the Mac OS.) For heavy-duty departmental serving, Apple has announced two new top-end servers, the Network Servers 500/132 and 700/150, both scheduled to ship by April.

Targeted at mission-critical enterprise users, the 500/132 and 700/150 servers feature the PowerPC 604 CPU, running at 132MHz and 150MHz, respectively.

ROBERT PERRY

Apple returns to the Unix market with new servers.

The servers come in a new doublewide tower form factor, which provides improved front-panel component access that doesn't require removing the enclosure, plus physical security features to prevent unauthorized access to controls and components.

Built-in features include dual PCI buses with a total of six slots, an internal SCSI-2 Fast/Wide bus, 32MB of RAM, redundant hot-swappable disks, and third-party UPS (uninterruptible power supply) support. Extra-cost options include Fast Ethernet (100BaseTX) and multisegment Ethernet. The 500/132 has seven front-accessible, hot-swappable internal storage bays, while the 700/150 has nine internal bays.

Complete packages including Apple's AIX start at about $10,000 for the Network Server 500/132 and about $13,000 for the 700/150.

To the standard AIX feature set, Apple adds AppleShare 4.2.1, which supports up to 3000 open files and 250 concurrent users. It also offers graphical remote administration tools for managing one or more servers directly from a Mac.

WONDER BOY

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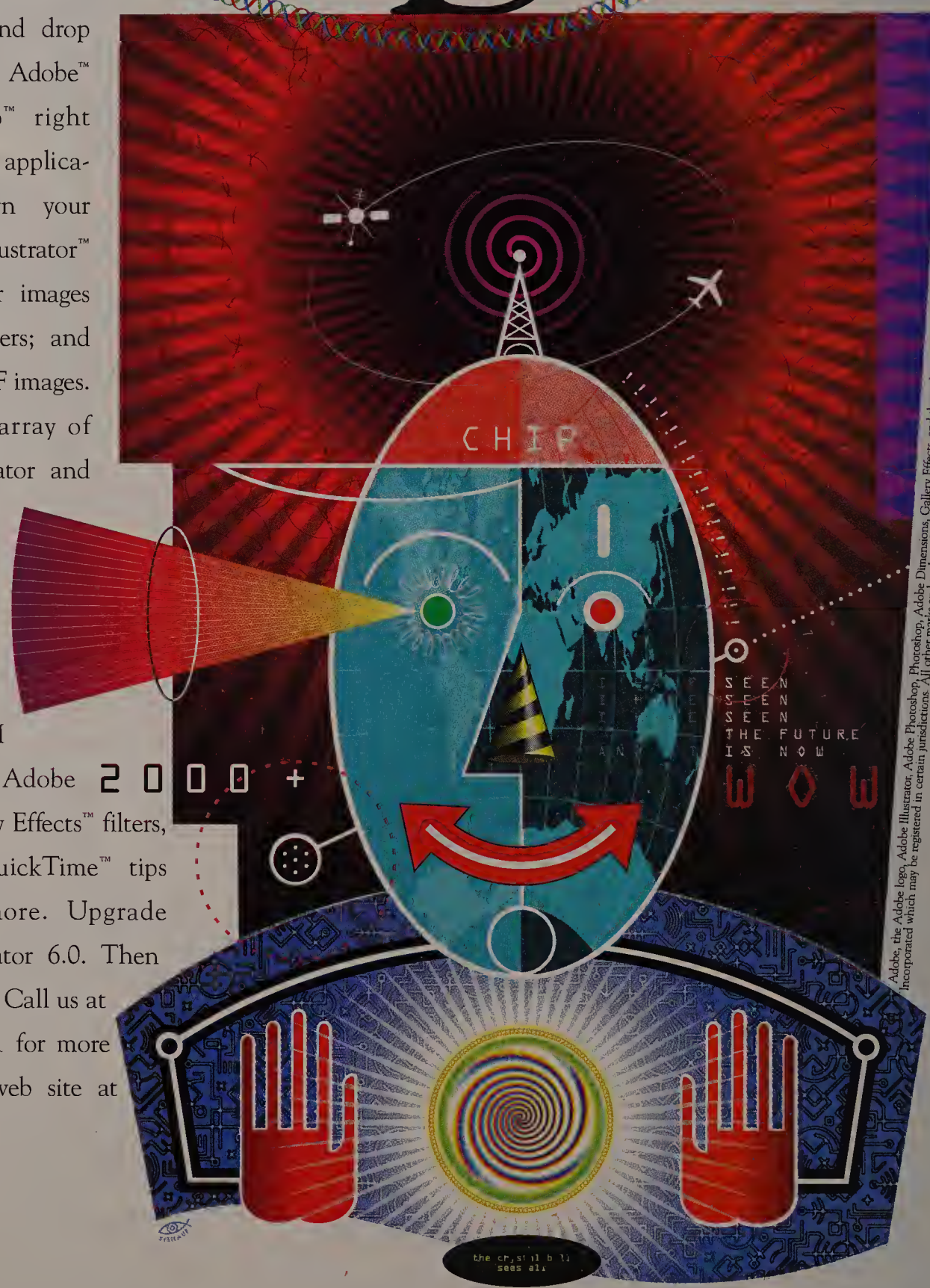

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Circle 252 on reader service card

"NEW NOTEBOOKS"
continued from page 33

although it can use the same batteries and expansion-bay devices as the 5300-series PowerBooks. To accommodate the CD-ROM drive, the Hooper has a deeper palm rest and a clever sliding door in the expansion bay that will open for the CD-ROM drive and close for the smaller expansion-bay products that can also fit in a 5300.

A new internal bus connector will support fast video boards and DMA architecture on the input/output channels, which means that the Hooper should be the first PowerBook that can hold its own against even the fast desktop Macs. The new bus is based on PCI but cannot accept PCI cards. All Hooper models come in the same case size, whether or not you install a CD-ROM drive.

Batteries Fixed Hooper will have newly redesigned Sony lithium-ion (LiIon) batteries. Sony now understands the cause of the battery fires in the PowerBook 5300: it was a problem in the older battery's internal charging circuit.

To fix the problem, Sony has a new charging circuit in the battery that may not work with the original 5300 models. Apple is changing its PowerBook 5300 charging circuits to work with the new battery, but the change means that early-production 5300's will not be able to charge the new LiIon battery even though they can run on the batteries.

Owners of early 5300 models can charge the new LiIon batteries externally in the VST (508/287-4600) charger model available today. The BTI (213/728-7874) charger for 5300 batteries does not support any LiIon battery types.

FRANCISCO CACERES

Mainstream Towers Apple's desktop-system plans are less ambitious. The most interesting new product seems to be the Performa tower, code-named Instatower. Tower designs have traditionally been reserved for servers and business desktops, because most home and small-office users don't need all the drive bays. But Power Computing has shown that towers can be sold to anyone, even in the Mac market, where this case design is new; in the PC market, towers have been more broadly accepted for several years.

Based on the PowerPC 603 and expected to ship this summer, the two Instatower models will have the ports on the top, rather than on the back, for easier access. They will also feature PCI slots, not the LC III–style slots traditional on Performas. One model will run at 100MHz, the other at 120MHz.

Faster but Familiar Other new Macs planned for the year are essentially faster versions of existing models. For example, Apple will come out with faster versions of the Power Mac 7200, 7500, 8500, and 9500 as soon as April.

Apple hopes to have a 150MHz PowerPC 604 in both the 8500 and 9500, but if IBM cannot guarantee a large enough supply, Apple will offer the 150MHz 604 CPU only in the 9500. The 7200 will likely have a 100MHz PowerPC 601 CPU, while the 7500 will likely offer a 120MHz 601 CPU.

Apple may delay the release of the faster versions if it has too many current Power Mac 7200's in inventory; these systems did not sell as well as expected, and Apple cut prices in January to spur sales. At the same time, Apple believes the shortage of 7500's and 8500's will end in April.

Similarly, a new LC and Performa, code-named Chimera, will likely ship in April as an LC model for the education market and in June as a Performa model for the consumer market. The Chimera will be available in 120MHz PowerPC 603 configurations in the United States and Canada, and in 100MHz configurations in other countries.

A lower-speed LC, code-named Excalibur, is also due out this spring. These would replace the Power Mac and Performa 5200, 6290, and 6300 series, all of which will be discontinued by July, and the LC 580, which will be discontinued by October.

In a slightly different vein, one model each of the upcoming Power Mac 7200 and 7500 systems will include a PCI-based DOS Compatibility card (see "Apple's Pentium Macs," in this section). Apple will also sell the cards for owners of other PCI Macs. Although demand for DOS Compatible systems and cards exceeded Apple's initial expectations when it first shipped the Quadra 610 DOS Compatible system nearly two years ago, current demand has dropped and Apple is scaling back the number of DOS Compatible systems it intends to offer. This system will spell the end of the 68040-based Performa 640 DOS Compatible, which Apple plans to stop selling by October. That will leave the PowerBook 190cs as the only 680X0-based Mac in Apple's lineup.

The PowerBooks' Bumpy Ride Continues

PLANS FOR A 133MHZ MODEL ARE SCUTTLED

Apple continues to have its share of troubles with the PowerBook 5300 series. First the 5300's were recalled because of problems with the LiIon batteries (see "Apple Recalls PowerBook 5300 Series," *News*, December 1995). Then a variety of problems turned up in the hardware and software (see "More PowerBook 5300 Woes," *News*, February 1996). Apple fixed the major software problems with a System update in January (see "Systems Watch," *News*, April 1996) and corrected all the hardware problems with changes in manufacturing.

But now there is a new hitch: Apple had planned to improve performance on the fastest PowerPC PowerBook model, the 117MHz 5300ce. But a planned 133MHz model has been canceled because of problems obtaining high-speed PowerPC 603e CPUs and because Apple could not get the 133MHz design to meet federal radio frequency emissions standards.—CARY LU

Apple Bolsters Its Internet Servers

FASTER PCI MACS AND UPDATED SOFTWARE

by Mel Beckman

Showing its commitment to keeping the Mac in a leading role as an Internet server—after Unix-based systems, Macs constitute the largest group of computers used to host Web sites—Apple (408/996-1010) has updated its line of Internet servers with two new systems: the PowerPC 601–based Workgroup Server 7250/120 (a 120MHz system based on the Power Mac 7200) and the 604-based 8550/132 (a 132MHz system based on the 8500).

Both come with Apple's Internet Server Solution 2.0, an upgrade to Apple's previous Internet server bundle that combines StarNine's WebStar Web server software with other Web tools. Apple continues to sell its Workgroup Server 6150/66, which is based on the Power Mac 6100 and remains the only NuBus-based Apple Internet server; the two new models, scheduled to ship by April, use the PCI bus.

All three systems have built-in Ethernet and a quad-speed CD-ROM drive. The 7250/120 and 6150/66 come with 16MB of RAM and a 1.2GB hard drive, while the 8550/132 comes with 24MB of RAM and a 2GB hard drive. All three systems support Apple's software-based RAID levels 0 and 1, and the 8550/132 includes an internal SCSI-2 bus and an external SCSI-1 bus.

Apple says the 6150/66 system costs about $2300, the 7250/120 about $3300, and the 8550/132 about $6450. The prices include the Apple Internet Server Software 2.0 bundle, which is not available separately (however, owners of version 1.0 can upgrade for free by calling 408/862-3385).

The version 2.0 software contains upgraded versions of components in the original product: the WebStar 1.2.5 Web server manager; Adobe Acrobat Pro 2.1 portable-document software; AppleSearch 1.5.1; BBEdit 3.5; runtime versions of Butler SQL and Tango from EveryWare Development; and numerous preconfigured Web sites, scripts, and other tools. New with version 2.0 are the Netscape Navigator 2.0 Web browser, the Adobe PageMill 1.0 Web-page publisher, Progressive Networks' RealAudio Server 1.0, MacDNS domain-name server with load sharing, Maxum's NetCloak 2.0 scripting extension to HTML, and Kitchen Sink Software's ServerStat 1.0 access-statistics analyzer. Apple also includes Open Transport 1.1.

KEVIN CANDLAND

Apple's two latest Internet servers offer speeds as fast as 132MHz.

The Incomplete New Navigator

DELAYED SUPPORT FOR JAVA PLUG-INS

by Geoff Duncan

Java, Sun's machine-independent programming language for Web applications, is all the rage on the Web, so it was an unpleasant shock when Netscape announced that Navigator 2.0 (see *Reviews*, in this issue) would ship without Java support on the Macintosh. Also, patchy availability of Macintosh plug-ins has started to make the Mac appear to be a second-class online citizen. But help is on the way.

Java Coming—Slowly Netscape (415/528-2555, *sales2@netscape.com*) Navigator will support Java on the Mac, although initial releases with this support aren't expected until April. Sun (415/960-1300) only released its Mac Java programming environment in mid-February.

Why the delay? Java applets are designed to run on a software "virtual machine" that clients must emulate. Since Java's virtual machine is based on a multithreaded, preemptive system (features that won't begin to appear in the Mac OS until Copland appears in early 1997), Sun's developing a virtual machine for the Mac is more complicated than it is for Windows NT, Windows 95, or Unix. Navigator 2.0 for Windows 3.1 also didn't ship with Java support, since Windows 3.1 too lacks these features.

Even when Java programs arrive for the Mac, users should expect steep memory requirements (12MB just for Java), and Java may not run on 680X0 Macs.

Plugging In the Mac Macintosh plug-ins for Navigator have also been slow in appearing, but the reasons for the delay are more diverse.

Some delays can be traced to Netscape's lack of Macintosh resources during version 2.0's early development, although this has become less of a problem in recent months. For example, Jonathan Gay, a developer of FutureWave Software's (619/637-6190, *fwave@cts.com*) SmartSketch CelAnimator

plug-in, notes, "Netscape provided very little support last year, but lately its Mac support has been good." On the other hand, Totally Hip Software (604/685-6425, *info@totallyhip.com*) developed its Sizzler animation plug-in very quickly, and gives Netscape high marks.

Sometimes the obstacles had nothing to do with

Netscape. For example, the initial release of Adobe's (415/961-4400) Acrobat plug-in, code-named Amber, was originally slated for January, but was delayed by internal development constraints.

Similarly, although QuickTime movie plug-ins from individual developers appeared quickly, Apple's (408/996-1010) more sophisticated QuickTime support requires more development effort. Progressive Networks' RealAudio 2.0 plug-in was forced to wait for Open Transport 1.1.

Other developers have noted that the Mac OS's interface for plug-ins can make the programming more difficult than for Windows.

What's There Now Nonetheless, after a slow start, Netscape's Mac development materials have been complete for several months and Mac developer interest has been widespread. An architecture, like Navigator's, that supports plug-ins is more compelling for a company to invest in than a helper application is, since users prefer the direct integration of a plug-in.

In some cases, these plug-ins are RAM-hungry little beasts. Macromedia's Shockwave, for instance, suggests that you give Navigator 8MB alone. We snickered when we heard the RAM requirements for Windows 95—they're even larger. Here's a list of the Netscape plug-ins available at press time for the 2.0 Macintosh version of Navigator.

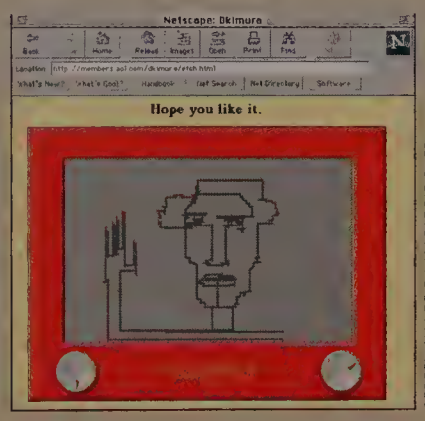
• **Envoy** Similar to the Adobe Acrobat PDF format, Tumbleweed's Envoy creates electronic documents that retain the layout of the original, including formatting, fonts, and printing capabilities. It's also possible to include URLs within an Envoy document (*http://www.twcorp.com*).

• **Amber** View electronic documents created by Adobe Acrobat. This unsupported alpha release of Amber supports in-line viewing of PDF files but doesn't yet include progressive display (text first, followed by images) or page-at-a-time downloads (*http://www.adobe.com/Amber/Index.html*).

• **Lightning Strike** Infinet Op's Lightning Strike is a viewer for images compressed with Infinet Op's wavelet compression technology (*http://www.infinop.com*).

• **RealAudio** Listen to dig-

continues



SCREEN IMAGE BY MARJORIE BAER

Look no further than this working Shockwave Etch-A-Sketch imitation by Darren Kimura at *http://members.aol.com/dkimura/etch.html* for proof of intelligent life on the Web. The knobs are animations with moving shadows.

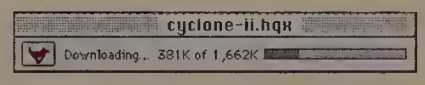
Sneak PEEK

The SimpleText of Internet Access

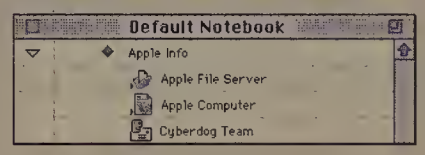
BY CAMERON CROTTY

Ambivalence is the order of the decade at Apple, and no project is immune. At first, Cyberdog was just a technology demonstration—a shill for the grand OpenDoc show. But now the 'dog's star is rising fast as Apple looks for a peg on which to hang communications services in the Mac OS.

Unlike any other Internet-access software, Cyberdog revolves around the Notebook, a list of your Net resources: URLs for Web pages, FTP and Gopher sites, names of newsgroups, and E-mail addresses. Double-clicking on a Notebook entry automatically fires up the appropriate browsing tool, or you can drag an entry and drop it on a browser window. You can group Notebook entries under simple header items called Categories, although you only get one layer of hierarchy—a problem Apple says it will fix. The Notebook is not without its warts: renaming an item requires that you dive into a menu, and there's no easy way to import large quantities of bookmarks from another browser.



Cyberdog tells you how long it will take to get where you're going.



Cyberdog keeps all URLs in a single notebook, be they FTP, Web, or E-mail addresses.

The Cyberdog Web browser is a model of simplicity peppered with some nifty features. The Log, for instance, holds a record of every site you've ever visited, and you can sort it chronologically, alphabetically, or hierarchically; this last groups all the pages from a single site together in a rough, relational hierarchy. The Web browser supports a tolerably advanced set of HTML tags (all of the 2.0 specification, plus tables and background pictures); not surprisingly, there's no support for either Java or Shockwave.

Cyberdog's news reader handles its duties with a minimum of fuss and sports several civilized features, including News Handlers, with which users can filter unwanted posts out of their news by author and subject. The lack of navigational buttons for next and previous messages is disconcerting, but you can advance through posts by pressing the spacebar.

Despite a corresponding Mail Handler, the E-mail component is Cyberdog's weakest link, simply because of its lack of robust address-book features. You can store addresses in the Notebook and send messages to multiple recipients by shift-selecting your intended targets, but there is no way to make address groups, short of creating multiple instances of single addresses.

Cyberdog feels like nothing so much as the SimpleText of Internet browsers. Each component does its job neatly, and if it's not as expansively tricked-out as other tools, neither is it nearly as unwieldy.

ital audio files created for RealAudio servers. (For an example, see *http://www.macworld.com/Sounds/rmw.mar96.RAM.*) Progressive Networks' streaming servers allow you to begin listening to audio files before you've downloaded the complete file (*http://www.realaudio.com*).

• **Shockwave** View Macromedia Director files optimized for Internet delivery (*http://www.macromedia.com*).

• **Sizzler** This plug-in from Totally Hip Software displays animations created in Totally Hip's Object Scenario (not yet released). These streaming animations load immediately, similar to an interlaced image, improving resolution as the file finishes downloading (*http://www.totallyhip.com*).

• **Speech** A plug-in that relies on the Mac's Speech Manager to "speak" the text on a Web page (*http://www.albany.net/~wtudor*).

• **Talker** Listen to your Mac synthesize speech from the text on a Web page. You'll need to install Apple's English Text-to-Speech software (*http://www.mvpsolutions.com*).

• **True Speech** Listen to digital audio created by DSP Group's True Speech technology. Uses a streaming technology similar to the RealAudio technology (*http://www.dspg.com*).

• **ViewMovie** View QuickTime movies as an integrated part of a Web page. You'll need to install QuickTime on your Mac (*http://www.well.com/user/ivanski/download.html*).

Bandai's Pippin Arrives

WILL IT BECOME THE HOME INTERNET SURFER?

by James A. Martin

Exactly what is Pippin, the game player and Internet surfer derived from Mac technology? A sneak preview of Bandai Digital Entertainment's (310/404-1600) Pippin prototype for the Japanese market reveals a device that is neither fish nor fowl, and that may be too expensive and too far behind the cutting edge to win mass approval.

Bandai's Pippin system, dubbed Atmark and expected to ship in the United States by fall, has a 66MHz PowerPC 603 chip, a 4× CD-ROM drive, a proprietary PCI expansion slot, and 6MB of RAM. The Atmark I tested looks like a bulky external CD-ROM drive and has all the expected connections for a home entertainment center: 16-bit, 44kHz stereo input/output; S-VHS video output; and connectors for NTSC, PAL, and VGA monitors. The Atmark also has two ADB ports and will ship in Japan with a boomerang-shaped trackball/joystick that resembles the alien spaceship in *The War of the Worlds*, and an external 14.4-Kbps modem.

One of the Atmark's biggest potential advantages is its two serial ports, located on the rear panel, which will let you easily attach standard Mac devices.

Currently there are no Pippin titles announced in the United States, but Mac software developers will be able to port their titles to the Pippin with minimal effort—

KEVIN CANDLAND

Bandai's Atmark is the first Pippin device.

although that may not always be an ideal situation. Titles such as Brøderbund Software's Living Book series, with their large graphics and type, look great when displayed by an Atmark on a 27-inch, color TV. But many reference titles and other CDs designed for the Mac contain text and icons that become illegible when projected on a large TV.

Although the Atmark ships configured as a game device—no keyboard or printer—serious gamers will have reason to grouse. For one thing, while the latest dedicated game consoles sport specialized hardware that can run games with 32-bit, 3-D graphics, the Pippin's 603 CPU supports only 8-bit and 16-bit graphics in 2-D. And by this fall consumers will face a new, potentially dazzling CD technology: the Digital Video Disc (DVD), a high-capacity format that can store a two-hour movie on one CD (see "The Next-Generation CD-ROM," *News*, April 1996). Finally, with other game systems costing $400 or less, Atmark's initial ¥640 (about $640) price tag is off-putting (the final price for the U.S. market was not set at press time). Neither a hard-core gaming device nor a full-fledged computer, the Atmark—and Pippin in general—have a tough road ahead.

Hot Internet Products

SOFTWARE COMPANIES LINE UP NEW RELEASES

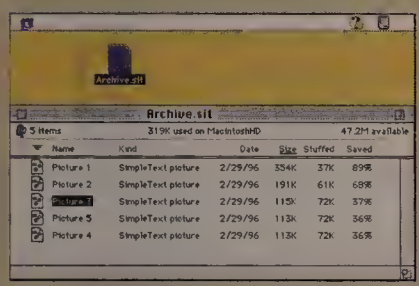
by Cameron Crotty and Matthew Hawn

Making the Internet easier to use, faster, and more secure, these hot products are coming soon to the Macintosh desktop.

Quick Construction What's the digital age's answer to the old advertising saw, "Just add water"? Just add content? QuickSite, DeltaPoint's (408/648-4000, *sales_support@deltapoint.com*) $99 Web site–creation and –management software, automatically constructs and styles your Web site based on selections you make on multiple-choice forms. The software also includes page templates to get you started. For more advanced users, QuickSite in-

cludes an HTML editor, support for image maps, and HTML 3.0 tags. The Mac version is slated to ship by June.

Data Squeeze Aladdin Systems (408/761-6200, *cust .service@aladdinsys.com*) is working to put a genie in your Mac OS with the $130 StuffIt Deluxe 4.0. In the latest release, double-clicking on a StuffIt archive opens a Finder window listing the contents of the archive, just as if you had opened a folder. You can drag and drop items into and out of the archive and StuffIt will automatically compress and decompress them. Oh, and did we mention that the StuffIt Engine is now faster?



It looks like just another window, but it's really a StuffIt Deluxe 4.0 archive, open directly in the Finder thanks to Aladdin's True Finder Integration technology.

View from Afar Putting its own twist on the "free samples" approach to software distribution, Farallon (510/814-5100, *info@farallon.com*) has announced two freeware applications that provide some features of the company's commercial Timbuktu Pro software. Look@Me, which is similar to the Observe function in Timbuktu, lets one user view another user's screen via a TCP/IP network like the Internet. With FlashNote, users can send files and short messages directly to each other, bypassing mail servers and gateways. In both cases users must type in their target's IP address manually, but Farallon is investigating ways to get around that requirement in future versions. Look@Me will be available for the Mac by May, with FlashNote to follow soon after.

Pulling Strings Breaking the Web browser's grip on the Internet, Marionet 1.1 lets developers integrate Internet connections into everyday applications. Built by Allegiant Technologies (619/587-1314, *info@allegiant.com*), Marionet runs as a small background application, handling Internet protocols like HTTP (for Web pages), FTP (for file transfers), SMTP/POP (for E-mail), and NNTP (for newsgroups).

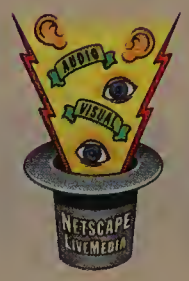
Security Blanket With all the digital paranoia flying around, it's good to know that ViaCrypt (602/944-0773, *info @viacrypt.com*) will be shipping updated Mac versions of its E-mail–encryption software by this summer. ViaCrypt PGP will come in two flavors: Personal Edition ($129) and Business Edition ($149). Both feature a floating tool bar dubbed the Enclyptor for signing, encrypting, and decrypting within any application. Business Edition adds features for IS managers, including key expiration and the option to give the administrator access to any encrypted message.

Cult Classic Bare Bones Software's (508/651-3561, *sales @barebones.com*) BBEdit text editor has always been a cult favorite among HTML authors. Originally aimed at software developers, BBEdit includes sophisticated HTML editing extensions for those who like to work directly with HTML code. BBEdit 3.5.2 adds a spelling-check engine and integrates some HTML extensions into a floating tool palette. A PageMill Cleaner extension is included to correct HTML errors made by Adobe's PageMill 1.0 authoring software.

Internet WATCH

BY CAMERON CROTTY

Netscape's World



The battle over Internet standards continues. Netscape has announced LiveMedia, an architecture for delivering real-time audio and video data over the Internet. Netscape will integrate the technology into its clients, servers, and content-development tools in the second half of 1996, and is working to have LiveMedia adopted as a formal Internet standard.

LiveMedia is made up of a mixture of technologies—some currently existing standards, including the Internet Realtime Transport Protocol, H.261, and MPEG; and some new ones from InSoft, a collaborative-multimedia software company acquired by Netscape.

Several companies have announced plans to support LiveMedia, including Adobe, Macromedia, and Progressive Networks.

First-Class Upgrade

Long the choice of dial-in bulletin-board sysops, SoftArc's (905/415-7151) FirstClass has made steady inroads into the enterprise market as an E-mail/group-communications system. Now the company has shipped version 3.0 of the Macintosh client, with support for Open Transport, multiple undo levels, and blind-carbon-copy addressing. This summer SoftArc expects to ship versions 3.5 of both the $495 Macintosh server and the free client. The new server will be Power Mac native, support Open Transport, and feature enhanced administration tools, as well as SQL, DAL, and ODBC database connectivity. FirstClass is also preparing server extensions to ship later this year that will support SMTP, MIME, and NNTP (Internet mail and news protocols). The 3.5 client software will include an extension technology so developers can write plug-ins.

TeleFinder BBS 5.0

Spider Island Software (714/453-8095, *info @spiderisland.com*) has added Internet protocol support to the latest version of its popular bulletin-board software. Version 5.0 of the $675 TeleFinder BBS can serve Web pages and Java applets, and supports CGI scripts. Sysops can assign personal Web spaces for BBS users, and monitor and bill for page storage and usage. Spider Island has also added a POP3 mail server.

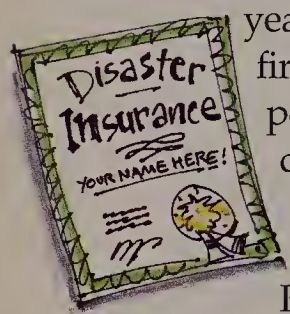
PETER HOEY

How to make a full recovery when disaster strikes.

Disasters don't play favorites. It doesn't matter if you're a huge corporation. Or a one-man band. The result is the same: without Retrospect®, your files can be completely wiped out in a second.

1. *How to get disaster insurance for your data.*

Data loss will happen to half of us this year: meteors, fire, theft, earthquakes, power surges, hard disk failure, human error—it goes on and on. But with Retrospect and a solid backup strategy, nothing can harm your data.



2. *Before you back up.*

Figure out what you'll back up to—removable cartridges or a dedicated backup drive. For lots of files, you want a device with the capacity for unattended operation—say DAT, DLT, or an autoloader.

3. *How to back up if you're a small company.*

Retrospect will show you the best way. The EasyScript™ feature sets up a backup strategy from your answers to a few simple questions, then carries it out automatically to whatever media you select.

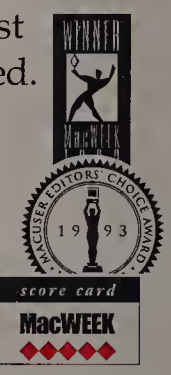
4. *How to back up if you're a big company.*

The answer is Retrospect Remote®, our network backup product. Use a set schedule or the more flexible Backup Server™ which automatically backs up Macs with the oldest backup first—ideal for PowerBooks that appear and disappear off the network. The bottom line: Retrospect Remote covers your network like a blanket.

5. *How to laugh in the face of danger.*

We're not suggesting standing on the top of the building during a lightning storm. But when disaster strikes, Retrospect can restore whatever you're missing—files from your latest backup, older files, or the entire hard drive.

Take the next step. There has to be a reason why more people rely on Retrospect than all the rest combined. Why it consistently earns the top scores, the best reviews. We have the answers. Call us at 800-982-9981 for our *Understanding Backup* white paper. It would be a disaster not to.



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Circle 26 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

COMMUNICATIONS

The Digital Connection

Frustrated when you're on the road and can't find an analog phone line to connect your PowerBook modem to? Angia Communications (801/371-0488) has a solution. The $129 SafeSend lets you connect a PowerBook 5300 or 190, using Angia's SafeJack PC Card fax modem, to a digital phone line.

Angia SafeJack

Newton Unwired

The Newton MessagePad is supposed to free you from your desk, but as soon as you connect it to your LAN you're no longer mobile. Dayna Communications' (801/269-7200) $560 CommuniCard Roamer wireless AppleTalk network card gives your Newton LAN access without the tether.

Serial-Port Expander

Keyspan (510/222-0131) offers the $539 Smart Serial 6, a six-port serial card for PCI Macs. The card's multiple serial ports let you have multiple simultaneous modem connections.

DISPLAY

Plentiful Presentation Options

For presentations, even a 20-inch monitor is too small. Depending on your needs, there are several technologies that could work for you.

• One solution is an extra-large monitor, such as ViewSonic's (909/869-7976) $3995 29GA, which has a 29-inch screen and a remote control. A Mac video adapter is required.

• Another option is an electronic whiteboard that includes video-display capabilities, such as Smart Technologies' (403/245-0333) $18,000 Rear Projection Smart Board. The 42-inch touch-sensitive display system includes an LCD projector.

• More traditional is the LCD projector. Panasonic Broadcast & Television Systems (201/392-4319) has two new models: the 10.4-inch, $4550 PT-L104U DataPro Lite I panel and the $7495 PT-L290U DataPro Lite II projector. Both units include built-in speakers. Another option is Chisholm's (408/559-1111) $9995 Galaxy Model V470, which is meant to display legibly even in lit rooms.

• Finally, you can use an existing TV as the display device. Digital Vision (617/329-5400) offers the $500 TelevEyes/SC, which also has microphone and speaker jacks for use in multimedia presentations.

EDUCATION

Games That Teach

These CD-ROM games are designed to be both fun and instructive.

• The Learning Company (510/792-2102) offers the $99 Interactive Math Journey for children ages 6 to 9.

• Brøderbund Software's (415/382-4400) $40 Logical Journey of the Zoombini teaches children ages 8 to 12 mathematics skills.

Favorite Fables

These CD-ROMs focus on reading.

• The Learning Company's (510/792-2102) Reader Rabbit's Reading Development Library 3, a $50 CD-ROM for children ages 5 to 8, includes the classic stories *The Princess and the Pea* and *The Goose That Laid the Golden Egg*.

• Philips Media's (310/444-6500) $35 Haunted House CD-ROM is based on Jan Pienkowski's pop-up book of the same name.

• Edward Lear's Book of Nonsense ($24.95) from Maxima New Media (201/458-1476, *aronst@ibm.net*) includes the title story.

GRAPHICS

Scanners, Big and Small

If you're looking for a high-end scanner for color publishing, consider Agfa's (508/658-5600) $19,995 Horizon Ultra flatbed scanner, which has an optical resolution of 2000 by 1200 pixels per inch (ppi).

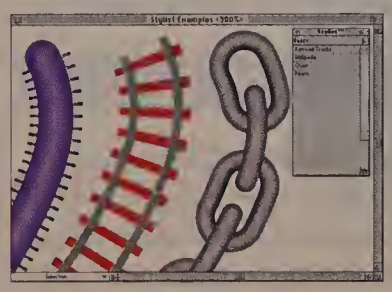
For less ambitious needs, there's the new Color OneScanner 600/27 from Apple (408/996-1010), a $649 flatbed device with 300-by-600-ppi optical resolution. The 27-bit scanner recognizes up to 134 million colors.

For a bit less, there's Microtek's $400 ScanMaker E3, a flatbed device with 300-by-600-ppi optical resolution. The 24-bit scanner recognizes up to 16.7 million colors.

Special Effects

Whatever your favorite graphics program is, chances are you'll want to extend it with special-effects plug-ins, such as the following.

• Alien Skin Software (919/662-4934, *alien@mercury.interpath.net*) offers Stylist 1.0, a $199 plug-in for Adobe Illustrator 6.0 that lets you apply effects to objects and have the effects automatically reapplied if the object is changed.



Alien Skin Software Stylist

• Ray Dream (415/960-0768, *info@raydream.com*) is shipping two plug-in sets for Ray Dream Studio (see *Reviews*, elsewhere in this issue). The $79 Professional Lens Pack offers camera and lens effects, while the $29, 3D Fun Pack adds anaglyph, chromadepth, and stereogram effects to 3-D images.

• Auto F/X (603/772-4725) has Photo/Graphics Edges Volume III, a $249 set of effects to use on the edges of images. It works with Adobe Photoshop 2.5 and 3.0 and Fractal Design Painter 3.0. The $249 Video/Graphics Edges Volume I is a similar package for use with Adobe After Effects 2.X, Adobe Premiere 4.0, and Avid VideoShop 3.0.

MULTIMEDIA

CD Player to Go

The newest PowerBooks still don't have CD-ROM drives, but thanks to Panasonic Communications & Systems (201/348-7000) you can add one. The $499 KXL-D742 is a 4× drive that attaches to a PowerBook 190 or 5300 via a Type II PC Card. The 14-ounce drive can connect to a desktop Mac via a SCSI interface.

CD Recording

If you're looking for software to help you create CDs from your Mac, look at Discribe ($400) from CharisMac Engineering (916/885-4420), which supports most recordable CD drives. Another option is Corel CD Creator, a $249 program from Corel (613/728-3733). Both support all popular CD formats.

Whatever software you use, you'll need a CD-R drive. New options include the $1295 RCD 5040 from Pinnacle Micro (714/789-3000), which includes its own recording software; the $1395 CDD2000 from Philips Electronics (408/453-5129); and the $1295 CD.maker CDR-22PE from CMS Enhancements (714/517-0915).

Audio Tools

Whether you're a sound engineer, multimedia producer, musician, or hobbyist, there is a wealth of sound-oriented software available.

• Opcode Systems (415/856-

continues

New Products

3333) has released Vision 3.0, a $495 MIDI sequencer.

• Berkley Integrated Audio Software (415/331-2446) offers Peak, a $299 audio editor/processor that supports Adobe Premiere audio plug-ins. The company's add-ons cost $199 each: Composer/Audio Designer Pak for special effects, Sampler Pak for sample editing, Audio Pro Pak for audio editing, and Audio Librarian Pak for sound cataloging.

• Janus Interactive (800/766-0835) offers the $699 New Professional Sound Library, a six-CD set of about 5000 sounds in AIFF format.

NETWORKING

Cheaper Transceivers

Three companies have lowered the prices on Ethernet transceivers: Farallon Computing (510/814-5100, *info@farallon.com*) has the $39 EtherMac AAUI 10BaseT; Kingston Technology (714/438-2741) has the $59 EtheRx with both 10BaseT and

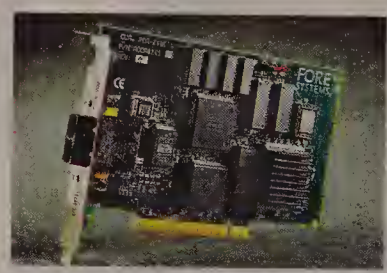
Farallon EtherWave

10Base2 connectors; and Dayna Communications (801/269-7200) has the $140 five-pack ($28 each) of its DaynaPort EasyNet 10BaseT. Farallon also has reduced by 40 percent the size of its $109, daisy-chainable EtherWave transceivers.

Superfast Connections

Bigger files and multimedia demand faster networks, and the newest Macs can handle the speed.

• Fore Systems' (412/772-6600) $995 ForeRunner PCA-200EMac PCI Bus ATM adapter adds Asynchronous Transfer Mode high-



Fore Systems ForeRunner

speed networking to a PCI Mac.

• Ragula Systems' (801/281-3434) $329, 10/100VG AnyLAN PCI Network Adapter is the first 100VG Ethernet card for the PCI Mac.

• Sonic Systems (408/736-1900) offers the EtherFE 10/100 Fast Ethernet cards for both PCI ($299) and NuBus ($399); the cards support 10BaseT and 100BaseTX networks. The company also offers the $1299 FastHub/8, an eight-port 100BaseTX hub; and the $899 FastBridge, a pocket-size 10BaseT-to-100BaseTX bridge.

• Dayna Communications (801/269-7200) has begun shipping its $950 BlueStreak 10/100 Bridge for mixed 10BaseT-and-100BaseTX networks, and the $1250 BlueStreak 100/100 Bridge for all-100BaseTX networks. Dayna also has the $270 BlueStreak 10/100 PDS Adapter, a Fast Ethernet card for Macs using the LC III–style Processor Direct Slot.

• Asanté (408/432-1117) offers NetDoubler, network-acceleration software for its $239 AsantéFast 10/100 Adapter for PCI Macs running Open Transport. If you own another company's card, you can get NetDoubler for $99 per client.

ONLINE

ISDN Internet Comes Home

Want ISDN Internet connections in your home or small office? Farallon Computing (510/814-5100, *info@farallon.com*) has just the product for you: the $529 (list price) Netopia ISDN Modem. Farallon adds Internet-access and its own setup software to this OEM version of the 3Com Impact (see *Reviews*, in this issue). For another $99, Farallon will handle setting up your ISDN line with the phone company (you pay the phone company's normal charges).

Dow Jones Goes Mac

The popular Dow Jones News/Retrieval online database now has a Mac client. The software is available free (call 800/522-3567, ext. 52), while the cost of the service depends on your usage.

PRINTING

New StyleWriters

Apple (408/996-1010) has upgraded its Color StyleWriter line with two new models. The $309 Color StyleWriter 1500 offers 360-dpi resolution in color and 720 by 360 dpi for monochrome. The $399 model 2500 offers 720-by-360-dpi resolution in both modes, and lets you add a network adapter ($99 for LocalTalk and $189 for Ethernet).

STORAGE

SyQuest's Latest Clone

Playing catch-up with Iomega again, SyQuest Technology (510/226-4000) has announced the SyJet drive, a removable 1.3GB cartridge system similar to Iomega's 1GB Jaz drives. SyQuest says the $499 SyJet should ship by July; 650MB cartridges should cost $65, 1.3GB cartridges $95.

Disk Array for AV

Micropolis (818/709-3300) has released the RAIDion SpeedStack dual-drive array for RAID levels 0 and 1. The 4.2GB version costs $4720; the 8.6GB version is $5800.

TITLES

Amelio Shares His Experience

Before joining Apple as CEO in February, Gil Amelio cowrote a book, *Profit from Experience* ($25; Van Nostrand Reinhold, 212/254-3232), with William Simon on how Amelio rescued ailing National Semiconductor, and it provides a glimpse of what he may do at Apple.

Virtual Reality Made Real

Virtual is hot, and two books offer to help you join the action. *The VRML Sourcebook* ($30; John Wiley & Sons, 212/850-6630), by Andrea Ames, David Nadeau, and John Moreland, explains how to use the Virtual Reality Markup Language. Written by Virtus principals David Smith, Richard Boyd, and Alan Scott, Hayden Books' (800/428-5331) $40 *Virtus VRML Toolkit* book-and-CD combo teaches 3-D Web-publishing techniques and includes Virtus VRML software.

PageMaker 6 Help

Learning the latest version of PageMaker? Five books can help. Written by *Macworld* editors Galen Gruman and Deke McClelland, *PageMaker 6 for Macs for Dummies* ($20; IDG Books Worldwide, 800/434-3422) is aimed at new and moderately experienced users.

More advanced users have three options: Que's (800/428-5331) $40 *Special Edition Using PageMaker 6 for Mac*, by Rick Wallace; the $28 *Real World PageMaker 6*, by Bruce Fraser, *Macworld's* Steve Roth, and Olav Martin Kvern (Peachpit Press, 510/548-4393); and the $40 *Macworld PageMaker 6 Bible* (IDG Books Worldwide, 800/434-3422), by William Harrel and Craig Danuloff.

Spanning the spectrum from beginners to pros is Sharyn Venit's $35 *Mastering PageMaker 6 for the Mac* (Sybex, 800/227-2346).

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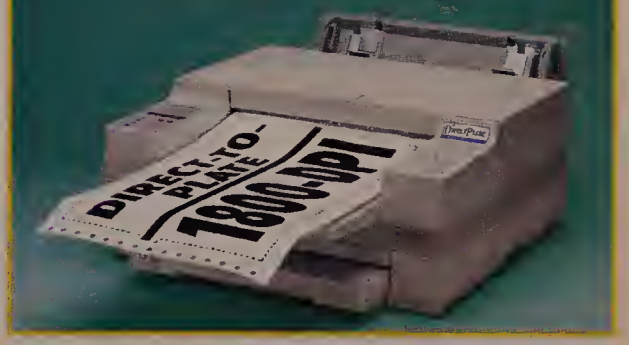

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Circle 103 on reader service card

Reviews

[Internet ESSENTIALS]

Navigator 2.0

NETSCAPE PUSHES BEYOND WEB BROWSING

HANK OSUNA

A PHENOMENON CALLED THE World Wide Web came smashing through the computer world in 1995. Netscape Communications, a start-up company, rose to prominence thanks to a piece of software (nicknamed Mozilla) it essentially gave away. In the ensuing pandemonium, almost every software company began scrambling to create a Web product or strike a deal with a company that already had one, lest they be left behind. Welcome to the sequel: Navigator 2.0. (Note: IDG, *Macworld*'s parent company, owns a stake in Netscape Communications.)

After launching Navigator 2.0 and connecting to the Internet via your TCP/IP connection (either dial-up or a dedicated network), you're faced with the browsing window and a row of navigation buttons that connect your computer to the World Wide Web and give you access to its millions of multimedia "pages" of hyperlinked information. From a Web surfer's perspective, the look-and-feel of Navigator hasn't changed much; the point-and-click metaphor still applies. But beyond this window, there's a philosophic change. With Navigator 2.0, Netscape attempts to establish an architecture that will let the program grow into an all-in-one Internet platform while continuing to keep its browser state-of-the-art.

Don't Worry, It's Still a Browser

At the heart of Navigator is an engine that takes HTML (HyperText Markup Language), a text-based page-description language, and displays it in the graphical form of a Web page. That's really all a Web browser does. HTML was designed as a deliberately simple language to facilitate the exchange of information across computer platforms and across the world, but as commercial uses of the Web have increased, so has the demand for more-sophisticated page-layout options, and Netscape has led the way in innovations.

Navigator 2.0 supports a wider variety of page-display options by extending the HTML code with proprietary tags. Among the features the Netscape extensions add are

Frames Frames place individual HTML pages as panes within the main window, each pane displaying a separate HTML document. Frames can act as a navigation tool to control other frames, or to display split pages. However, frames also complicate the basic navigation of a window because they throw off the sin-

RATINGS | Outstanding ★★★★★ = 9.0–10.0 | Very Good ★★★★ = 7.0–8.9 | Good ★★★ = 5.0–6.9 | Flawed ★★ = 3.0–4.9 | Unacceptable ★ = 0–2.9

gle-page metaphor that browsers were designed around.

Ledges A ledge is a static frame that places a banner across the top or bottom of a browser window. Ledges contain static content such as a navigation bar or an advertisement.

Client-side support for image maps Navigator 2.0 can read a new kind of clickable image map that doesn't require accessing the server to add hyperlinks to different areas of the image. This new feature supports the offline use of HTML on CDs or from a local cached file.

Text-display modifiers A handful of new text-display modifiers control color, font size, and justification, as well as text wrap within text-entry fields.

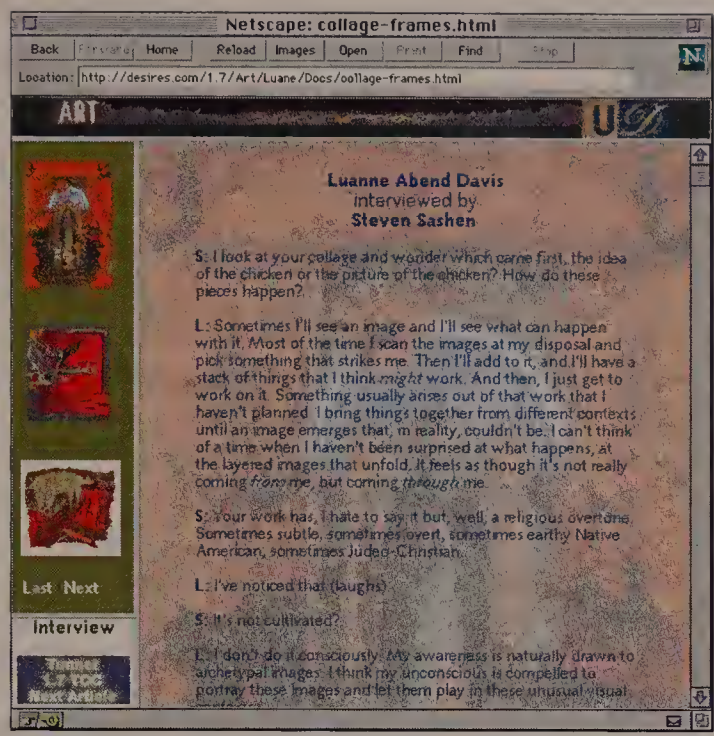
Plug-ins and Java

The most notable of Navigator 2.0's additions is a plug-in architecture, like that of Adobe Photoshop. Browsers have traditionally handled multimedia content, such as QuickTime movies and digital audio, using small helper applications that require a separate window or interface. Navigator's plug-in architecture makes it possible to integrate this content as part of a Web page. Using a series of HTML tags, you can create pages that display multimedia content *in-line* (as an integrated part of the page), rather than in a separate window.

Netscape has published information that enables any developer to write Netscape-compliant plug-ins as new content types appear. Many companies with competing browsers, including Microsoft, say they will adopt a plug-in architecture that supports the Netscape plug-ins. The biggest drawback in this new multimedia bonanza is the RAM requirement: many of these plug-ins require 8MB dedicated to Navigator. Multimedia may be cool, but it isn't cheap.

Support for Java, Sun Microsystems' programming language for the Internet, is built-in but not fully implemented. Navigator 2.0 recognizes a subset of Java called JavaScript, which embeds some of Java's features in HTML pages, allowing Web designers to create interactivity that relies on the browser and not on the Web server. Java applets are supported in the Windows version but only partially supported for the Mac (see "The Incomplete New Navigator," *News*, in this issue).

Netscape's expansion of HTML using extensions, plug-ins, and Java means the company has stepped around the slow-moving Internet standards committee. Plus, Navigator's popularity forces other Web-tool developers to follow Netscape's additions to the standards. Netscape's extensions are by and large an improvement on the current state of HTML, but they present a problem for Web developers and authors. While these extensions follow the demands of the market and give Web authors much more control over content, they also fragment the HTML standard. It's a shame that, if used haphazardly, these extensions can render a Web page unreadable and unnavigable to other browsers, and developers can lose the part of their audience not using Navigator.



Navigator 2.0's Frames Urban Desires (*http://desires.com*) uses Netscape's frame extensions to HTML as a navigation tool. The story is on the right; clickable thumbnails on the left let you jump to illustrations. There's also a clickable image map to take you back to the contents page or the site's home page.

Performance Improvement

Netscape has also revved Navigator's performance. Version 2.0 has a better FTP (File Transfer Protocol) implementation for downloading software from the Internet; transferring files is now much improved, particularly at higher bandwidths. By creating a new window for downloads, Navigator 2.0 doesn't tie up the main browser window or force you to open another window to keep surfing. Also new is a Netscape extension to HTML that provides uploading capability so you can use a form to upload files to a Web server.

In addition to supporting GIF and JPEG images, Navigator 2.0 adds support for the enhanced JPEG format, which allows a wide range of colors with good compression. There are more GIF images on the Web, but photographers prefer JPEG because of the wider range of colors it can display.

Navigator as a Lotus Notes Replacement?

Other additions to the Navigator interface are meant to facilitate communication between users. A large percentage of Web-server software is sold to businesses that intend to create internal Web sites to support and distribute information to employees and customers. Known as *intranets*, such servers are meant to replace proprietary systems, like Lotus Notes, or even office E-mail systems, such as CE Software's QuickMail or Casady & Greene's cc:Mail. Conceptually, an intranet offers a lot of advantages to businesses, including good cross-platform support, inexpensive client software, and a more direct Net interface that gives your business a global reach.

Unfortunately, Navigator's collaborative-communication tools are not yet on a par with dedicated programs. The new E-mail interface adds some nice features, most notably the ability to receive E-mail from a POP mail server. The new mail reader looks a lot like the browser window and includes a bare-bones address book for storing E-mail addresses; supports threaded (grouped by subject) mail; and reads HTML formatting, allowing you to include hyperlinked text and graphics in your mail. A small icon in your Web browser notifies you when you have mail.

However, Navigator doesn't match up to current E-mail products like Claris Emailer or Qualcomm's Eudora Pro. Navigator does not support quoting E-mail in your replies or maintaining multiple E-mail accounts or services, and its method of embedding HTML within E-mail looks messy when viewed by another E-mail application.

Navigator 2.0 also includes a new Usenet news reader, but the interface is unnecessarily complicated, and hard to use on a small screen. Netscape plans to

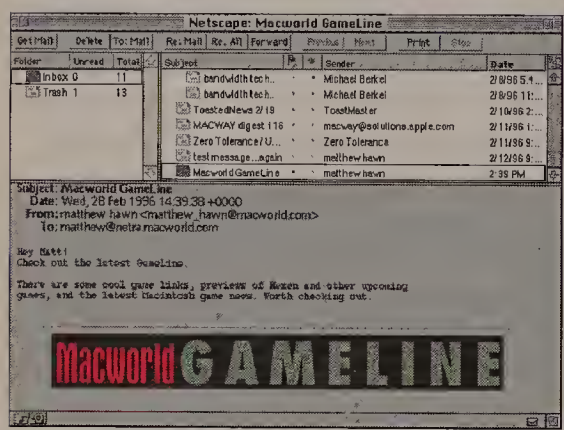
continues

ship a more robust product called Navigator Gold that will include HTML authoring features that might make these communications tools more usable, but they currently need vast improvement if Navigator wants to compete with office E-mail programs or Lotus Notes. Better still would have been a component software structure to allow users to select third-party replacements for these tools.

I experienced fewer crashes with 2.0 than with previous versions, but it's still not as stable as it ought to be, especially if, as Netscape expects, you use it to replace other Internet apps. It's also worth noting that you need Open Transport 1.1 to use Navigator 2.0 with a PCI-based Mac. Apple should have released that Open Transport upgrade by the time you read this.

The Last Word

With a slew of new features, interface improvements, and a display architecture that is leading the burgeoning Internet industry, Navigator 2.0 is an ambitious product. But is it a successful one?



HyperMail Navigator's mail viewer lets you embed GIF and JPEG graphics as well as HTML documents as a part of your E-mail. But in other E-mail programs you'll see the raw HTML.

As a Web browser, Navigator is at the top of its class. No other product even comes close for browsing the Net. But as a collaborative cross-platform tool for business, it has a long way to go. I'll be using Navigator 2.0 to surf the Web, but I'm not ready to toss out my other Internet tools just yet.—MATTHEW HAWN

RATING: ★★★★/7.6 **PROS:** Support for in-line multimedia. **CONS:** E-mail and news-reader interfaces are anemic. **COMPANY:** Netscape Communications (415/528-2555). **LIST PRICE:** Without manual $49, with manual $69.

[Internet ESSENTIALS]

DragNet 1.03

THE STORY YOU ARE ABOUT TO HEAR IS TRUE: THERE IS A GOOD URL TOOL

AT SOME POINT LAST YEAR, I stopped making bookmarks for Web sites with Netscape Navigator because I dreaded the huge menu I was creating. The bookmark features in Navigator 2.0 are an improvement, but they don't go far enough if you are serious about organizing your URLs. The situation is the same or worse with all the other Web browsers.

OnBase Technology's DragNet gets it right. DragNet replaces your Web browser's bookmark files with a searchable database, and uses the Mac's drag-and-drop features for adding and launching URLs.

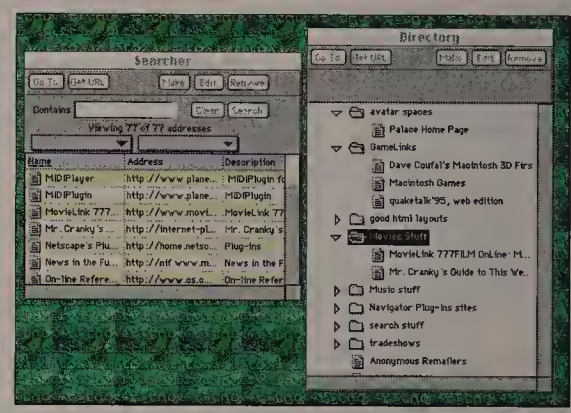
While designed to work with Web browsers, DragNet also nicely supports E-mail and Internet protocols such as FTP through Peter Lewis's Internet Config freeware utility (not included). For example, if you have Internet Config and an E-mail program like Eudora, DragNet automatically launches the mail program when you double-click on the database entry of an E-mail address, and puts the correct headers in an outgoing message. A simple Import/Export feature lets you turn your old bookmarks into a DragNet database and export your list as an HTML document.

A DragNet database has four view windows, but I mostly used just two. (Real estate is at a premium on my PowerBook screen, and because DragNet is a stand-alone application, switching between it and a browser often required hunting for the DragNet windows.)

The main Directory window shows your bookmark file in an alphabetical, Finder-like display with collapsible category folders. There are icons for most Internet protocols and for E-mail addresses. You can move URLs between categories, and holding down the option key when you move an entry cross-references that entry in both categories. Double-clicking on a category folder opens a separate Directory window for that category. As in the Finder, typing the first letters of a category name brings you to the folder.

I also frequently used the Searcher view, where you can search on text strings within the database (name, address, and description fields). You can limit your searches by category. Obviously, search results will be only as good as the data you enter into the Description field—but DragNet's bookmark searching is miles better than any other program's.

In the Addresses window, you add descriptive text to entries and can edit them. It also shows when you last visited that site. The HotList window, a pop-up



For Your Favorite Jack Webb Sites Each DragNet database view supports drag and drop.

menu for various categories, uses a radio-console metaphor with programmable buttons for favorite sites.

The Last Word

DragNet is the best Internet bookmark tool I've seen. Its search and organization tools are top-notch. I'm also happy to see that it is poised to mesh well with the next wave of Apple Internet tools; OnBase Technologies plans to make DragNet an OpenDoc part that will work with Apple's CyberDog, slated to ship at the end of this summer. In the recent flood of Internet utilities DragNet stands out as a truly useful tool.—MATTHEW HAWN

RATING: ★★★★/7.4 **PROS:** Good search features; customizable; easy to use; supports Internet Config. **CONS:** Separate application means constant window-switching on small screens. **COMPANY:** OnBase Technology (714/830-5682, *onbase@onbasetech.com*). **LIST PRICE:** $39.95.

Roaster DR1

JAVA-FOR-MAC SET TO PERK UP THE WEB

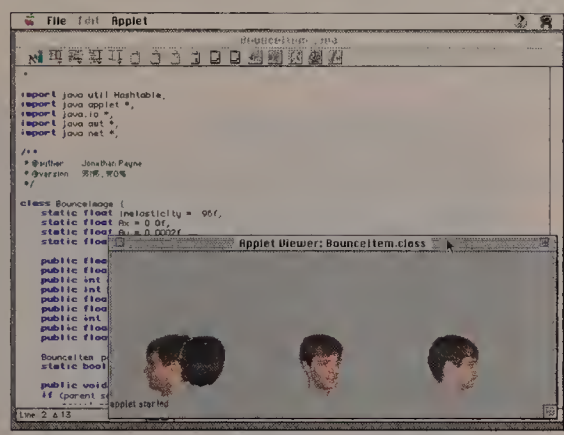
NATURAL INTELLIGENCE HAS applied its considerable experience creating programmer-friendly development environments (it created QuickCode Pro for 4th Dimension) to the challenge of getting Java jump-started on the Mac. Its latest product, Roaster, is the first Macintosh offering in the hottest new language in decades, and in several respects it's better than its Unix and Windows NT counterparts. I reviewed the developer release (currently for Power Mac only, with a 680X0 version on the way); it's more final than a beta, but it's not for those users who will find the inevitable potholes overwhelming.

Java, Sun Microsystems' Web language, keeps most of the object-oriented structure of C++ (classes, methods, hierarchies) but throws out some familiar tools (pointers and most kinds of user-directed memory management). It's geared toward producing *applets*—small, downloadable programs that run inside a Web browser window. It's a small enough language that you can learn its syntax pretty quickly if you're comfortable with object programming; the challenge seems to be in mobilizing Java for bigger jobs.

Not for Neophytes

So is Roaster a golden opportunity for the average Macintosh user? Probably not, Java being less than ideal for neophyte programmers. For example, a C programmer taking up C++ to learn object methodology has the advantages of an American moving to Montreal to learn French: the environment encourages you to use new language features, but it lets you slide into old habits when you need to. In contrast, Java doesn't let a programmer do *anything* but write classes; it's as resolutely modern and object-oriented as Newton systems programming. And while Java is in principle powerful enough to generate serious applications (see "Bouncing Heads"), it's enough work that Roaster-created applets tend more toward customized features for Web pages than toward database tools.

To produce platform-independent code, a Java system uses a "virtual machine" for each platform. Since Mac Web browsers—unlike Netscape Navigator 2.0 for the PC—are not yet Java-enabled, Roaster includes a separate program, Applet Runner, for viewing the compiled result. Other than that novelty, almost nothing here would surprise a Mac programmer: you develop your classes in a modern, project-oriented editor (it can open several projects at once) fairly similar to that of Metrowerks' CodeWarrior, with an intelligent Make facility and a hierarchical view of Java packages (collections of classes and interfaces). Roaster also supports project-specific preferences.



Bouncing Heads Roaster includes all of Sun's programming examples and demos, such as this one from the Gamelan online collection.

The editor borrows slick touches from QuickCode. QuickClipboards, when used with Roaster's programmers' macro system, is a nearly ideal tool for managing code fragments. Other features include a class disassembler and debugger, with true source-level debugging planned for Roaster 1.0 (expected to ship in May). For users who want to program a simple function right away, AppletViewer.class is a great starting point.

Some Questions

Roaster's compiler is fast compared with Sun's, but it occasionally produces odd compiled code or simply quits. Whether the problem with the compiled code lies in the compiler itself or in Roaster's implementation of the Macintosh virtual machine remains a mystery.

For devoted programmers the real question is, how easy is it to swipe, modify, and reuse other people's code? The answer is that it should be easy with Roaster, especially since cross-platform details are supposedly hidden at the virtual-machine level—but your mileage may vary.

Most of the Java applet code (available at *http://www.gamelan.com*) developed on Sun Unix systems runs properly under Roaster with no modification. Some applets from developers using Windows 95 have problems, though; for example, Roaster's Applet Runner has a tendency to shut down, leaving you inexplicably back at the desktop. And Roaster is generally pretty sparing with error messages, although glimpses of the final product suggest that its error flags will be more numerous and helpful.

If you won't be developing in Java for a few months yet, you need to consider whether Symantec and Metrowerks will dominate the Mac Java scene later this year. Natural Intelligence claims that it is now and always will be a rev and a half ahead of its competitors, that it has more staffers devoted to Java Mac-tailoring than do its rivals, and that it will do a better job because it has more at stake. Whatever the merits of these arguments, the company *has* proven that it can get a product to market significantly faster than the big C++ vendors.

The Last Word

Unless you insist on using Java in a giant environment that accommodates all other languages as well, Roaster could well be your best choice. For a rush job, the developer release is impressively complete and stable, and Natural Intelligence is slaving 'round the clock on a Roaster-for-everyone release. Another big plus: a call to customer support immediately connects you to the most experienced Java staff in the Mac universe. If you want to get going on Java right now, Roaster is a great place to start.—CHARLES SEITER

RATING: ★★★★/7.0 **PROS:** Richly customizable, QuickCode-like environment; little user setup required; documentation and support are good enough to get nonprogrammers started. **CONS:** Needs bug-fixes and better error handling. **COMPANY:** Natural Intelligence (617/876-4876, *info@natural.com*). **LIST PRICE:** $299.

[Internet ESSENTIALS]

ISDN Terminal Adapters

THREE SOLUTIONS FOR HIGH-SPEED INTERNET ACCESS

SURFING THE WEB AT ISDN speeds—64 Kbps to 128 Kbps—is a euphoric experience. Three entry-level ISDN terminal adapters (TAs) bring this euphoria to your Mac: Motorola's BitSurfr Pro, U.S. Robotics' Courier I-modem, and the 3Com Impact.

All three products include the TA, well-written quick-start and user guides, and PC serial cables. Only the Impact includes the Macintosh hardware-handshaking serial cable required to achieve ISDN data speeds, although Motorola and U.S. Robotics say future bundles will include a Mac cable.

How It Works

Like a modem, the TA attaches to a Mac's serial port, and MacTCP and a PPP dialer—such as FreePPP—provide the software link to establish a TCP/IP connection to an ISDN-capable Internet service provider (ISP).

A single ISDN line has two 64-Kbps Bearer channels—or B-channels—each carrying voice or data. A feature called Multilink PPP (MLP) may be used to join the two channels to form a single 128-Kbps data channel.

The BitSurfr and the Impact (but not the I-modem) support MLP. All three products support concurrent connections to the Internet and an analog device, such as a fax machine. The BitSurfr and the Impact offer dynamic bandwidth allocation, which automatically drops one B-channel of a 128-Kbps data link for an analog call, restoring the data link to 128 Kbps when the analog call completes. The Impact supports this feature only for outgoing calls, while the BitSurfr supports it for incoming and outgoing calls.

The BitSurfr Pro also provides two analog (known as POTS—Plain Old Telephone Service) RJ-11 jacks that support two simultaneous analog connections when the data connection isn't in use. The I-modem has a built-in V.34 analog modem for making calls over a single ISDN B-channel, letting you use the same Mac serial port for ISDN and analog modem connections.

Getting Started

An ISDN TA is more difficult to set up than a modem, mostly because ISDN is more complex than normal phone service. First your local telephone provider must install an ISDN line. Then you configure the ISDN TA to operate with your specific line.

SUZANNE ROADY

Faster Internet Access Motorola's BitSurfr Pro, U.S. Robotics' Courier I-modem, and the 3Com Impact give you ISDN speed.

To configure the TA, you enter one or two numbers provided by the phone company, known as Service Provider Identifiers (SPIDs), along with a handful of miscellaneous settings. Next you plug the ISDN line into the TA's ISDN jack and make sure the line is active and operating properly.

The Impact makes this task easy with its Mac setup application, which lets you interactively enter settings and download them into the TA. The software then automatically tests the ISDN line and displays detailed diagnostic messages that greatly simplify problem solving.

The BitSurfr has no native Mac configuration tool; instead, a text-based menu tool built into the hardware gives you interactive, albeit nonintuitive, access to configuration settings through a supplied terminal emulator. With no test tools and terse troubleshooting documentation, the BitSurfr was a challenge to get running.

The I-modem is the most Mac-unfriendly of the bunch: no Mac software, no interactive menu, and nothing in the manual about the Macintosh at all. You must study a lengthy installation guide and enter a long series of cryptic AT commands to configure and test the unit.

On the Hook

Once you configure the TA and test the ISDN line, you're ready to connect to an Internet service provider.

With the BitSurfr, I tested a beta of a customized version of Software Venture's Internet Valet—which provides one-click installation of a PPP dialer (InterPPP), and several Internet client applications. Motorola is bundling this software with the BitSurfr and a Mac serial cable; this package, BitSurfr Pro for the Macintosh, should be available for $495 by the time you read this. You fill in the access number, user ID, and password supplied by your ISP; Internet Valet configures the PPP dialer to establish a connection whenever you use an Internet client. Neither of the other products provide Internet software, so you have to make do with shareware or whatever your ISP supplies.

An OEM version of the Impact—Farallon's Netopia ISDN Modem (see "ISDN Internet Comes Home" in the *New Products* section of this issue)—wasn't available in time for this review. Netopia includes all the Impact's features, plus Internet software, for just $30 more.

All three products performed equally well at moving data over a single 64-Kbps B-channel. Tests at 128 Kbps, which excluded the I-modem, showed the BitSurfr and the Impact equally matched at high speeds. However, due to the serial-port limitation of 115.2 Kbps, neither TA achieves the full potential of a synchronous 128-Kbps ISDN link.

All of the products' analog jacks worked, but the BitSurfr's dual jack setup—complete with built-in call waiting and three-way conferencing support—is more versatile than a single jack.

The I-modem's built-in V.34 data/fax

modem—its sole exotic feature—may be handy for users who need modem access and don't have an available serial port, but that convenience comes at a high price. The integrated modem worked well for data calls, but the lack of Mac software makes it useless as a fax device.

The Last Word

An ISDN TA can offer four times the performance attained by today's best modems, although installation and setup require considerably more effort. Once you're over that hurdle, however, ISDN makes for a quick and painless Internet connection. The three products I tested perform well, but features, price, and ease of use are obvious discriminators.

The I-modem is feature poor, with single B-channel data, a single analog port, and no Mac software or documentation. At nearly twice the price of the competition, it's no bargain. The similarly priced Impact and BitSurfr are more evenly matched. But in spite of its elegant Mac configuration interface, the Impact loses out. With 128-Kbps connection capabilities, several useful voice features, and, by the time you read this, bundled Internet software—all at the price you'd have paid for a modem a few years ago—the BitSurfr is the best way to give your Mac an ISDN Internet feed.—MEL BECKMAN

3Com Impact

RATING: ★★★/6.9 **PROS:** Low price; dual B-channel data; bandwidth on demand; Mac configuration tool. **CONS:** Single analog port; no Internet software. **COMPANY:** 3Com (408/764-5000, *info@3com.com*). **LIST PRICE:** $499.

BitSurfr Pro

RATING: ★★★★/7.7 **PROS:** Low price; two analog ports; dual B-channel data; bandwidth on demand. **CONS:** No Mac configuration tool. **COMPANY:** Motorola (205/430-8000, *sales@motorola.com*). **LIST PRICE:** $495.

Courier I-modem

RATING: ★★/4.6 **PROS:** Integrated V.34 fax/data modem. **CONS:** Expensive; single B-channel data; single analog port; no Mac software. **COMPANY:** U.S. Robotics (847/676-7010, *sales@usr.com*). **LIST PRICE:** $895.

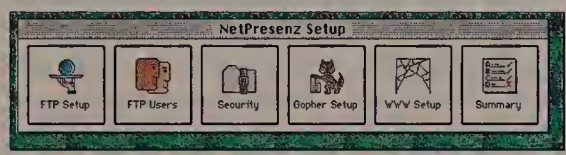
[Internet ESSENTIALS]

NetPresenz 4.0

INTERNET SERVER ON A SHOESTRING

ALL YOU NEED TO TURN YOUR Mac into a Web server is System 7, an Internet connection via Mac TCP 1.1 or Open Transport, and a $10 shareware program called NetPresenz 4.0. This Internet server software supports connections from FTP, Gopher, and Web clients, making it easy to distribute information over the Internet. It's from one of the most reliable sources of Mac shareware—Peter Lewis's Stairways Shareware.

In its earlier incarnations, NetPresenz was called FTPd. It's still a great FTP server, but the name change reflects this version's pumped-up Web-server features. While NetPresenz isn't powerful enough for a megasite, it's ideal for schools, small businesses, and intranet (internal network) sites.



Simple Startup With the Setup bar, you can set up NetPresenz and get it running in less than an hour.

NetPresenz comes with a utility that makes setup and administration a breeze, especially compared with setting up a Unix Internet server. The five-step configuration process is straightforward and easily customized. A summary window tells you if the setup was successful. In contrast to that of most other shareware packages, the documentation is easy to follow and includes a quick-start page. I set up NetPresenz on a Mac 6100/66 in less than an hour, configuring it to serve Web pages, download and upload files (both BinHex and MacBinary) via FTP, and make text files available to Gopher clients.

NetPresenz relies on the Finder's file-sharing capabilities to control access to the server from the Internet and allow varying levels of file access. The server also supports anonymous FTP connections. These security features aren't as flexible as those of Quarterdeck/StarNine's WebStar, but they're easier to set up. And Apple's file-sharing security, when used properly, is as good as any security on the Web; just be sure users have imaginative (and frequently changed) passwords and the administrator keeps group lists up-to-date.

Like WebStar, NetPresenz handles multithreaded execution and supports Common Gateway Interface (CGI) applications. A CGI script makes interactivity possible on your site; for example, you could use one to transfer information from HTML forms into a Claris FileMaker database. Some simple AppleScript-based CGI examples are included, but you'll want to read up on CGI scripts to make your site more sophisticated.

I didn't torture NetPresenz with a high volume of user traffic, since it seems better suited as an internal server for small workgroups or a site that isn't expected to be heavily visited. That's not to say NetPresenz is weak; small sites are more likely to run out of bandwidth than overpower this software. Using Open Transport version 1.1 should also improve its performance.

Two features I'd like to see in a future version are a built-in domain-name server (DNS) and better tracking logs, but these omissions are minor.

NetPresenz is available on the Web at *http://www.macworld.com* or *http://www.share.com/peterlewis*.

The Last Word

In the growing field of Mac Internet server software, NetPresenz more than holds its own. While WebStar has more features and does more-sophisticated performance tweaking, NetPresenz is an excellent program if you don't need all the bells and whistles. And you can't beat the price.—MATTHEW HAWN

RATING: ★★★★/7.8 **PROS:** Excellent setup utility; supports CGI applications. **CONS:** Minimal logging features; no built-in DNS. **COMPANY:** Stairways Shareware (*support@stairways.com.au*). **SHAREWARE FEE:** $10; site licenses available.

[Internet ESSENTIALS]

Top Ten Internet Books

MOST BOOKS ABOUT THE INTERNET ARE OUT OF DATE BEFORE YOU GET THEM HOME FROM THE bookstore. Our advice: stay away from Net phone books and print-based guides to cool sites. You will almost always find more-current online equivalents. The same goes for Web-browser handbooks. If you can't learn to use a Web browser without a manual, get a new browser, not a $40 book. On the other hand, here are my recommendations for ten Internet books that should have a longer shelf life.

Getting Started

The Internet and the World Wide Web, by Angus Kennedy (Rough Guides, 1995); ISBN 1-85828-198-9; $8.

If you are looking for an inexpensive but good introduction to the Net, this little guide is one of the best—and it doesn't come from a computer publisher at all. It isn't Mac-centric, but it does offer the basics and includes a guide to Net sites, written in the plain English that made the *Rough Guides* series indispensable for travelers.

Internet Starter Kit for Macintosh, third edition, by Adam C. Engst (Hayden Books, 1995); ISBN 1-56830-197-9; $35. Great selection of Mac Net software included on disc.

Weighing slightly less than a Buick, the third edition of this tome is a little intimidating and not particularly focused. But for a long time, this book has been the Mac Internet traveler's main reference. Its exhaustive coverage of Mac Net shareware supplements the bad documentation that plagues most of these applications, and it serves as a guide to the arcane world of the Net. If you need info on Mac Internet tools, chances are good you'll find it here.

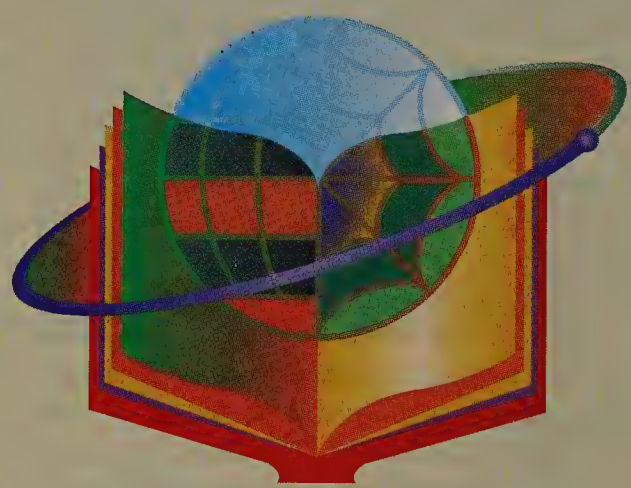
Design and Publishing

Teach Yourself Web Publishing with HTML in 14 Days, by Laura Lemay (Sams.net, 1995); ISBN 1-57521-014-2; $39.99. CD includes shareware and sample HTML and tutorial files.

Teach Yourself is the standard reference for HTML. Think of it as the Associated Press stylebook for the Web. Serious beginners should use it, and even experienced Web authors will refer to this book. Set it next to your Mac.

Web Publisher's Design Guide for Macintosh, by Mary Jo Fahey (The Coriolis Group, 1995); ISBN 1-883577-63-2; $34.99. CD contains good shareware design tools, artwork samples, and Web multimedia files.

Fahey's guide is aimed at Macintosh artists and designers, focusing less on HTML basics and more on good design. The book includes excellent step-by-step instructions for designers who want to make the transition from print design to Web design.



Publish It on the Web (Macintosh version), by Bryan Pfaffenberger (AP Professional, 1996); ISBN 12553143-5; $34.95. CD-ROM includes HTML 3.0 reference and some Web clip art.

Publish It on the Web provides a good overall view of Web publishing. This book offers solid advice on setting up shop on the Internet. It is heavy on techniques and tips, with little emphasis on products.

Planning and Managing Web Sites on the Macintosh, by Jon Wiederspan and Chuck Shotton (Addison Wesley, 1996); ISBN 0-201-47957-5; $39.95. CD-ROM includes demonstration WebStar server software, Common Gateway Interfaces (CGIs), and other administration tools.

This book focuses on the administration and management of a Web site running Quarterdeck/StarNine's WebStar Mac software. This nuts-and-bolts guide for Web masters draws on the authors' substantial experience in developing Mac server software and the CGIs necessary for interactivity.

Macworld's Creating Cool Web Pages with HTML, by Dave Taylor (IDG Books Worldwide, 1995); ISBN 1-56884-705-X; $19.99. Floppy includes the MacWeb browser from EINet and Mac-specific tips and files.

This small guide to HTML and Web-page structure offers good tips and techniques for the beginning page designer. Even though it's not as exhaustive as the Lemay book, it provides more real-world examples in an approachable writing style.

World Wide Web Marketing, by Jim Sterne (John Wiley and Sons, 1995); ISBN 0-471-128430; $24.95.

You can do more damage than good if you market your products on the Net without a little Net sense. Sterne's book is a good place to start to understand the hype, avoid the pitfalls that have plagued some unlucky Net pioneers, and build a marketing plan for the Web.

Culture

Rules of the Net, by Thomas Mandel and Gerard Van Der Leun (Hyperion, 1996); ISBN 0-7868-8135-6; $12.

More than a book of Netiquette, this little guide to life on the Net is irreverent and incisive. If it had fewer pages and were more focused, this would be *The Elements of Style* for the online world.

Happy Mutants Handbook, by various editors (Putnam Berkley, 1995); ISBN 1-57322-502-9; $15.

Happy Mutants Handbook is less an Internet book than a do-it-yourself guide to the digital zeitgeist. The essays, interviews, and Internet site lists are a great introduction to an emergent culture. Get it for your favorite wirehead.—MATTHEW HAWN

HANK OSUNA

Three PCI Disk Arrays

FAST ACCESS SPEED—BUT ONLY FOR THE WEALTHY

THREE NEW STRIPED (RAID LEVEL 0) arrays—FWB's SledgeHammer 7000FMF PCI II, the SledgeHammer 3500FMF PCI II, and ProMax Technology's PR2-16828W—are designed to exploit the faster speeds of the PCI bus in newer Macintoshes. However, in Macworld Lab's real-world tests, their performance is only incrementally better than that of NuBus arrays.

Bottlenecks in the Mac system and in many software applications limit the arrays' performance. Macworld Lab tested the arrays using Adobe Photoshop and Blitz Copy, a file-copying utility.

Blitz Copy achieves fast file transfers by reading and writing data with less overhead than Photoshop. However, Blitz Copy's speed is limited by available RAM. Photoshop transfers data in 64K or 100K chunks, which requires more overhead. For example, the SledgeHammer 7000FMF opens a 100MB photograph in Photoshop with a data-transfer rate just under 3MB per second (MBps). Using Blitz Copy, the data-transfer rate for the same file was 27 MBps.

To take advantage of PCI's 132-MBps speed, both FWB and ProMax include their fastest drive mechanisms. The SledgeHammer 7000FMF comes with four drives, connected to FWB's two PCI JackHammer SCSI adapters. The ProMax array's four drives connect to two Adaptec Power Domain 2940UW SCSI adapters. The SledgeHammer 3500FMF ships with two drives and two PCI JackHammer adapters. Each SCSI adapter creates a SCSI bus (or channel) that, according to FWB and ProMax, can carry 20 MBps of data. Each of the 7000FMF's four drives are potentially capable of write transfers of approximately 8 MBps; together, they could write data at an astounding 32 MBps.

The SledgeHammer 7000FMF is the fastest of the drives tested. Much of this margin comes from the faster write caching available on the PCI JackHammers.

Drawing Comparisons

There are significant differences among the arrays. The major one is price. At its suggested price, the ProMax drive's 16GB costs about $550 per gigabyte. The 7000FMF's retail cost is almost $1350 per gigabyte, and the 3500 is $1475 per gigabyte. (All prices include two PCI SCSI adapters.) With storage prices in a veritable free-fall, prices will continue to drop throughout the year.

The PR2-16828W drive ships with removable hard drives, so if a drive fails you can easily replace it. Each drive rests on a special sled with tabs that lock it securely in place. The SCSI bus connector and the power connector are located on a rigid backplane. Replacing drives takes only a minute or two, despite the manual's poor instructions and lack of installation diagrams. ProMax includes clear and concise instructions, with superb diagrams, for Adaptec's Power Domain card and for Trillium's (now part of Adaptec) Remus Limited 1.3.4 formatting software. FWB's user guide and formatting manual are exceptional.

Both FWB's formatter, RAID Toolkit Primer 1.7.5, and ProMax's Remus Limited 1.3.4 are flexible and easy to use. RAID Toolkit requires that all the array drives connect to the same SCSI bus, so you connect all the cables to one JackHammer. Remus Limited's interface requires program modes to add and partition drives, and can be confusing at first.

FWB's cables, like Apple's AAUI Ethernet connector and some AV monitor cables, make connecting and reconnecting drives and SCSI adapters frustrating. To get solid connections between adapters and cables you must jiggle the adapters and apply considerable force. (Basically, this difficulty is in part Apple's fault for providing insufficient clearance for expansion boards on the Mac's back panel.) ProMax's SCSI cables screw down easily.

Finally, ProMax allows you to set the SCSI ID between 0 and 15, whereas the FWB drives have a range of just 0 to 6.

The Last Word

The ProMax PR2-16828W with a PCI Power Mac is a good buy at its current price. I don't recommend the FWB drives at current prices. Most important, it will be six months to a year before applications are available that can fully exploit PCI's speed. Until then, expect long pauses for screen redraws, data-intensive filters, and data compression, and keep an eye on the dropping prices.—TIM WARNER

PR2-16828W

RATING: ★★★★/8.1 **PROS:** Comparatively low price; removable drives; can repartition without reconfiguring hardware; excellent PCI SCSI card manual. **CONS:** Installation guide for drives is confusing and lacks diagrams. **COMPANY:** ProMax Technology (714/727-3977, *promaxtec@aol.com*). **LIST PRICE:** $8890.

SledgeHammer 3500FMF PCI II

RATING: ★★★/6.5 **PROS:** Excellent documentation; software is easy to use. **CONS:** Cables sometimes difficult to attach; must attach all drives to one bus before configuring array. **COMPANY:** FWB (415/325-4392, *fwb.inc@aol.com*). **LIST PRICE:** $5169.

SledgeHammer 7000FMF PCI II

RATING: ★★★/6.9 **PROS:** Fastest array in our tests; excellent documentation; software is easy to use. **CONS:** Cables sometimes difficult to attach; must attach all drives to one bus before configuring array. **COMPANY:** FWB (415/325-4392, *fwb.inc@aol.com*). **LIST PRICE:** $9439.

MW LAB Speeds of PCI Arrays Compared

Times are in seconds. Shorter bars are better.

	Finder Duplicate	Photoshop Open	Photoshop Resize	Photoshop Save	Blitz Copy	Video Capture (no compression) MB/sec	Video Capture (no compression) Frames/sec
FWB SledgeHammer 7000FMF PCI II	20	167	429	143	8	23.2	19.7
ProMax PR2-16828W	22	159	460	129	10	20.0	14.0
FWB SledgeHammer 3500FMF PCI II	22	178	442	147	13	16.1	13.6
Hard drive on PCI*	45	195	487	129	35	5.4	4.5

*Conner CFP4207E SCSI-2 Wide drive attached with a single FWB JackHammer for PCI.

Macworld Lab tested arrays using two PCI SCSI adapter cards in a Power Mac 8500/120 with 32MB of system RAM.

Ray Dream Studio 1.0

COMPETENT, AFFORDABLE 3-D DESIGN TOOLS

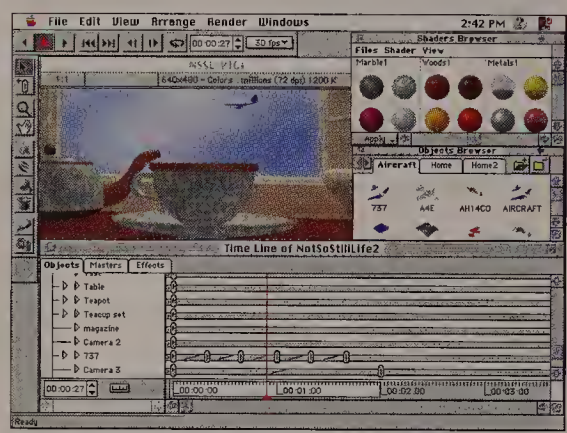
USEFUL 3-D MODELING TOOLS AND excellent rendering capabilities have earned Ray Dream Designer a large following among graphic artists and illustrators. As part of the new Ray Dream Studio package, Designer is now suitable for a broad range of multimedia applications as well. (If you don't need the animation component, Designer 4 is also available separately for $199.) The Ray Dream Studio CD-ROM includes Ray Dream Designer 4; Ray Dream Animator; Dream Models, a collection of fully editable clip art that you can use right out of the box; a generous selection of textures from third-party collections, such as Specular's TextureScape; and an Extensions Portfolio API for creating custom 3-D plug-ins.

Designer in Motion

Ray Dream Studio's animation module is a program extension that appears as an option in Designer 4's scene-hierarchy window. In animation mode, objects are listed hierarchically along the left side of the window (see "Designer 4 Gets Animated"). The hierarchy for an animation is deeper than a static scene's, extending down to individual object properties such as surface textures and shape transformations. Stretching off to the right of the hierarchy is a sequencer that displays a timeline for each property you can animate. From there you can open dialog boxes that let you ease in and out of event transitions and produce smooth motion paths. Similar dialogs let you apply specific actions, such as bouncing and spinning effects or tracking movements relative to other objects.

The animator also supports inverse kinematics, which lets you control linked objects' behavior to produce complex motions more easily. For example, you can constrain elbow movement on a modeled arm to natural limits and link arm segments so that tugging on the hand causes the entire arm to respond.

Studio's animator produces fairly sophisticated effects, but its controls tend to be limited and less finely tuned than Specular Infini-D's. For instance, motion paths aren't displayed on screen, so you can't edit them directly in space; animation previews are slow and clumsy, even with objects reduced to bounding boxes; and the time-edit controller doesn't register hours—only minutes, seconds, and frames. Of course, you wouldn't use this animator to build feature-length films, but if you needed to incorporate an animation at a certain point in an extended production—say at the 1-hour-and-10-minute mark—you couldn't prenumber the frames to match the longer sequence.



Designer 4 Gets Animated Ray Dream Studio combines an uncomplicated animation sequencer with Designer 4's modeling environment.

Scene Wizardry

Building on version 3's Modeling Wizard, Designer 4 introduces the Scene Wizard. Similar to its object-building predecessor, this terrific new feature is a series of dialogs that help you create 3-D environments, complete with lights, backgrounds, objects, and camera locations. Wizard-created scenes are completely editable, so you can use them as a starting point for your own work or simply as a way to learn scene-building techniques.

Also new are Designer 4's Deformers, which let you stretch, bend, twist, scale, and shatter objects in 3-D. Accessed from a new Object Properties dialog, the Deformers are great for producing character-animation effects such as dancing teakettles.

Designer 4 retains version 3's excellent rendering tools, with sophisticated editing controls that let you manipulate shader variables—color, shine, reflection, transparency, and refraction. You can also paint with shaders, applying them to object surfaces as distinct, editable shapes. With the new glow channel, you can create objects that appear to emit light.

Designer's modeling tools are essentially unchanged from version 3, but Ray Dream has refined and polished the interface to make the modeling environment cleaner and more comprehensible. A context-sensitive main menu bar has replaced the local window menus of the earlier version—the Freeform Modeler's, for example—so you no longer need to remember which menus to access. More-logically arranged camera controls make scene navigation easier. And the Shader Editor's much-praised card-file metaphor has been incorporated into both the hierarchy window and the Object Browser, though not the Shader Browser.

Designer's behavior is improved as well; the problems I noted in version 3 (see *Reviews*, July 1994 and March 1995) are notably absent. However, the program is memory sensitive. Even with the recommended 16MB of RAM (the preferred setting, not the minimum), Designer can quit or hang unexpectedly. I doubled the partition size to get Designer to run comfortably on my Power Mac 7100/80, and performance was still sluggish; computation-intensive tasks, such as 3-D painting, were painfully slow.

The Designer 4 manual is better organized, easier to read, and more helpful than its predecessor, and the animation manual does a good job of getting you started. For the technically inclined, Ray Dream Studio has complete documentation for building Designer 4 extensions.

The Last Word

Ray Dream Studio adds a capable animator and an abundance of models and textures to Designer's competent 3-D modeler and rendering tools. Even with Designer's prodigious memory requirements and trying performance, novice 3-D artists and budget-conscious pros alike will find this package an excellent value.—CARLOS DOMINGO MARTINEZ

RATING: ★★★/6.9 **PROS:** Competent 3-D design tools; excellent rendering; improved interface; inexpensive. **CONS:** Voracious RAM appetite; generally sluggish performance; animation controls need fine-tuning. **COMPANY:** Ray Dream (415/960-0765, *info@raydream.com*). **LIST PRICE:** $499.

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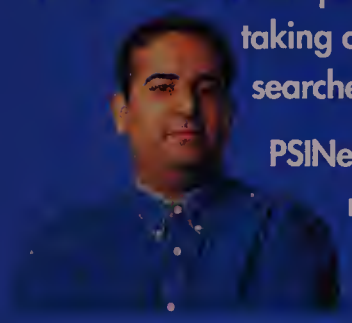

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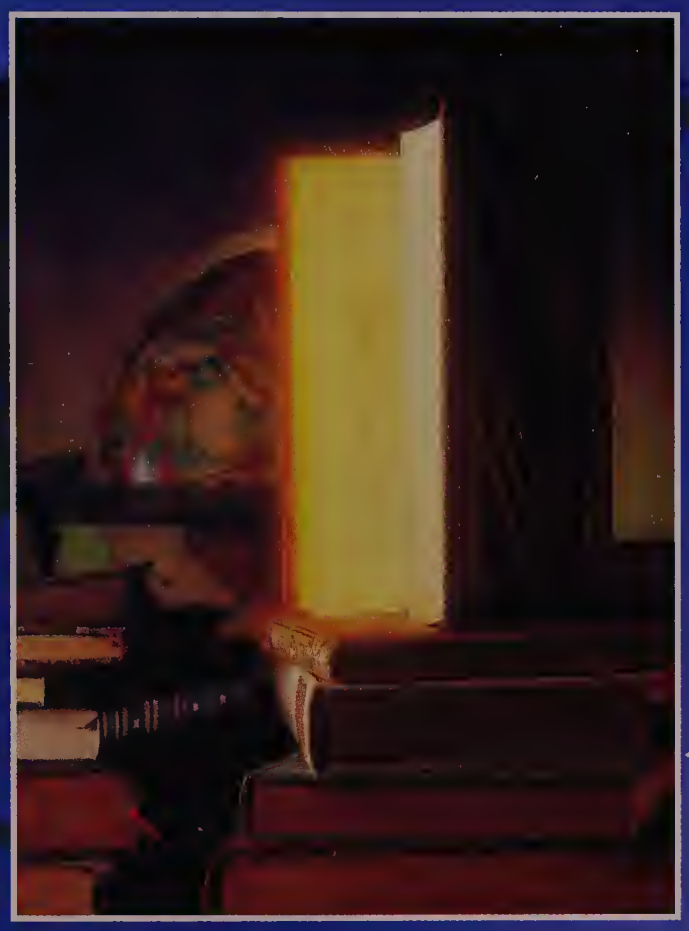

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Spanish-Language Tutors

THREE APPROACHES TO LANGUAGE INSTRUCTION

SOFTWARE-BASED LANGUAGE INstruction is an appealing concept—you can have all the interactivity of a classroom setting with none of the potential for public humiliation. Just be sure you know how a language program works before you buy it; the names may all sound the same, but different programs—like the three reviewed here—can take wildly different approaches to learning.

Learn to Speak Spanish 6.0

If you're looking for language instruction in the classic classroom mode, check out Learn to Speak Spanish (LTSS). These two CD-ROMs contain 30 lessons; each covers vocabulary, reading, conversation, grammar, and pronunciation and offers a suite of games based on that lesson. LTSS forgoes language-lab audiotapes and in-class quizzes in favor of QuickTime videos (see "Spanish in a Box") and interactive testing (you click on or point to an answer and are "graded" immediately). LTSS also includes ten grainy QuickTime movies about Mexico and a pronunciation guide beginners will find essential. The 345-page *Text/Workbook* is nice but redundant, containing the same stories, conversations, and exercises as the CDs.

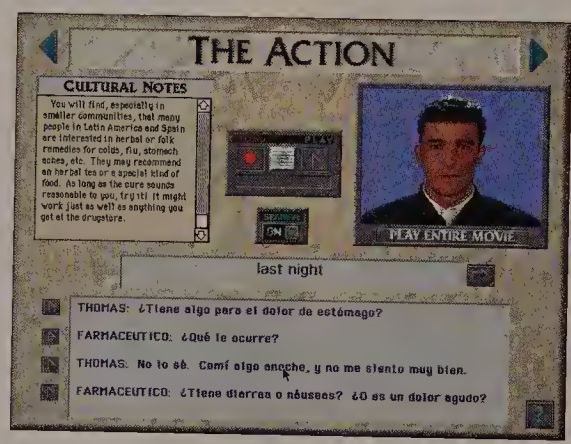
While LTSS's stories and dialogues cover a variety of practical situations (hiring a taxi, making a phone call), other parts of the program aren't so practical. If you're stumped by a question, you often have to reveal the answers to *all* the questions to see the answer you want. The enthusiastic "*¡Excelente!*" after every correct response gets pretty tiresome. And if you repeat exercises, the questions remain exactly the same; not only is LTSS unable to adjust exercises to your past performance, it can't even change the order of the questions for variety.

Spanish Now 4.0

Transparent Language's Spanish Now (not to be confused with Barron's *Spanish Now* books) has an entirely different premise: reading and listening to Spanish essays, conversations, and short stories. The text of a story is displayed in the main screen, surrounded by a confusing array of help boxes containing English translations of the current word, phrase, and sentence; the root words; and brief but enlightening grammatical comments.

The text is displayed and spoken either word by word, sentence by sentence, or without interruption. You can mark sections of the text and return to them later, add words to a personal vocabulary list, and attach notes to any word in the text. A basic grammar help file and a handful of pronunciation drills and games are included, and as in LTSS you can record your own pronunciation and compare it with the taped voice.

The single Spanish Now CD-ROM contains three stories from the Transparent Language catalog. Beginners will likely find the program intimidating; the easiest story isn't all that easy, you get very little information on how to use the program, and the audio control buttons are hidden from view. Once they get the hang of it, however, intermediate users will find Spanish Now a good way to maintain and improve their Spanish skills, especially if they have some other source of standard grammar instruction.



Spanish in a Box In Learn to Speak Spanish, cultural notes add information and interest; pointing to a word in the dialogue displays its English equivalent.

Spanish Native Guide 1.0

Unlike LTSS and Spanish Now, Spanish Native Guide (SNG) limits itself to vocabulary. But SNG isn't simply a set of 6000 flash cards—it has a bit of a brain. Starting with a few essential words, it keeps track of which ones you remember and which you forget, calculates what and how much you're likely to forget between sessions, and determines which words to ask and when to ask them. When the current word set is no longer a challenge, the program adds new words to the mix. It's a bit like juggling: when you prove you can keep three words aloft, it tosses you a fourth; when you master four, it tosses you a fifth.

To keep you on your toes, SNG asks for both Spanish-to-English and English-to-Spanish translations. You won't get any help with pronunciation (though Native Guide Software promises to include it in the upcoming CD-ROM version), and SNG does a poor job of showing words in context. Another snag is that information is stored in the program itself rather than in a data file; that means each user must work from a different copy, and the entire program must be backed up.

The Last Word

If you're a beginner or need a structured environment, Learn to Speak Spanish is a good place to start. Spanish Now's stories and essays are an engaging way to improve your skills if you already know a little Spanish. If your vocabulary needs work, Spanish Native Guide is a smart choice. And if you need practice conjugating those 500 irregular verbs, you'd best look elsewhere.—ROBERT C. ECKHARDT

Learn to Speak Spanish 6.0

RATING: ★★★/5.6 **PROS:** Comprehensive. **CONS:** Doesn't adapt to your needs or progress; some design elements need work. **COMPANY:** The Learning Company (510/792-2101). **LIST PRICE:** $109.

Spanish Native Guide 1.0

RATING: ★★★/6.2 **PROS:** Evaluates and adapts to your progress. **CONS:** No pronunciation help; words aren't shown in context. **COMPANY:** Native Guide Software (415/802-8085, *info@nativeguide.com*). **LIST PRICE:** $49.95.

Spanish Now 4.0

RATING: ★★★/5.3 **PROS:** Annotated and recorded texts are an engaging way to learn. **CONS:** Texts and recordings vary in quality; poor documentation; confusing interface. **COMPANY:** Transparent Language (603/465-2230, *info@transparent.com*). **LIST PRICE:** $129.

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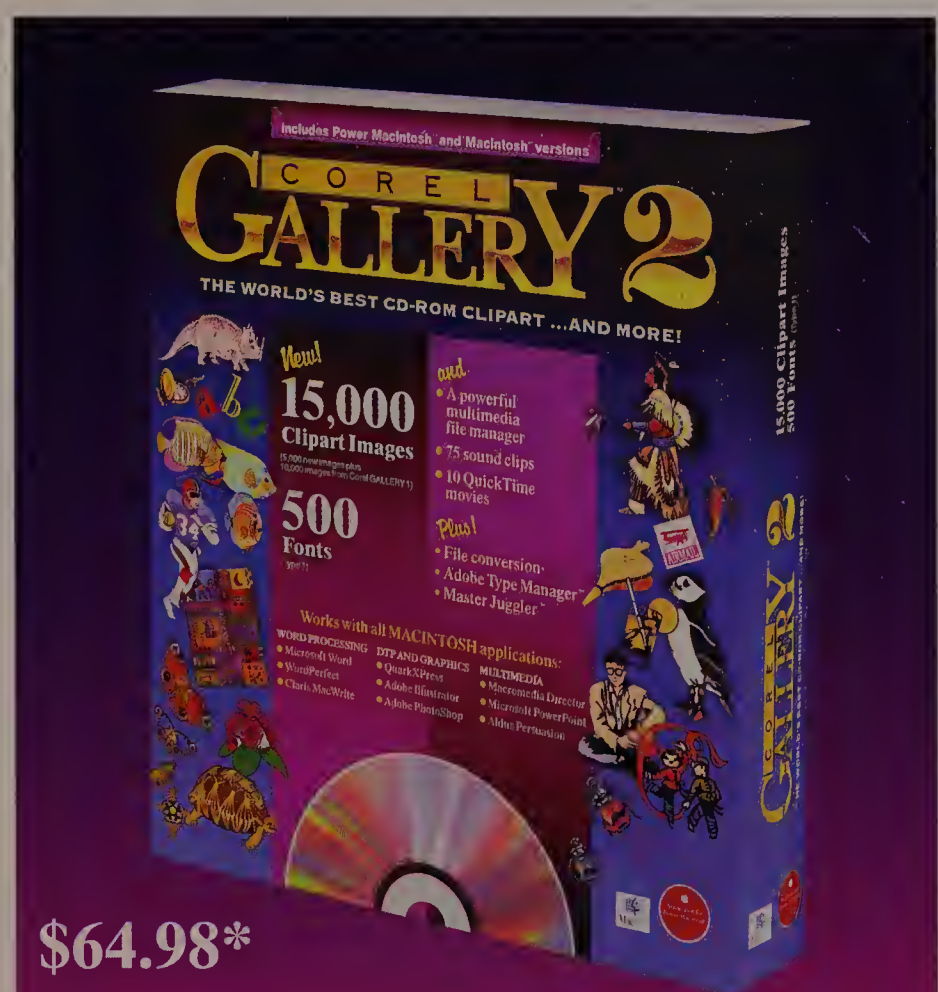

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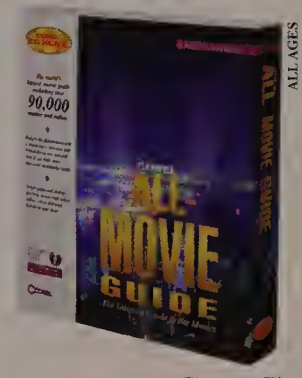

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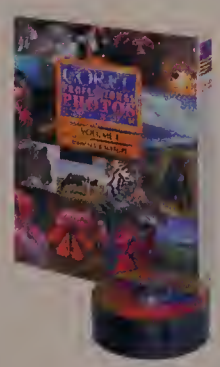

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Magic CD-ROMs

TRIO OF CDS PROVES TEACHING MAGIC CAN BE TRICKY

NEVER WAS A TECHNOLOGY SO well suited to its task as the CD-ROM is to teaching magic. A CD can illustrate tricks in a way no book or video can—interactively. The first few teach-yourself-magic CDs set out to capitalize on this ideal medium. Unfortunately, each misses golden opportunities to be magically instructive.

Learn the Art of Magic

Jay Alexander, the hyperactive host of Brøderbund's Learn the Art of Magic, is a terrific magician and a really nice guy. But you'd never know it from this CD-ROM. He comes across as a maniac on NoDoz, dashing around, leering into the camera, and weirdly inflecting—"This is the altogether *GROOOOO*-veeee jumpin' quarter *triiiiick!*"—in an attempt to substitute hysterics for actual humor.

Worse, the producers have chosen to lay on a thick layer of cartoon sound effects—grunts, gun ricochets, and so on. Add one amateurish video-distortion effect every 10 seconds, and you can begin to imagine how annoying this disc is.

As with any how-to-do-magic product, there's a dilemma: if you reveal excellent tricks to the masses, you'll face the wrath of fellow magicians. So while you can't blame Alexander for choosing only simple, well-known tricks, you *can* blame him for rushing through the 20 tricks with little mention of patter, style, or presentation. He seems more intent on simply giving away each trick than turning his audience (8- to 12-year-olds) into good magicians. Yet even that effort is botched: the QuickTime movies are inexplicably deprived of scroll bars, destroying half the CD-ROM's interactive potential.

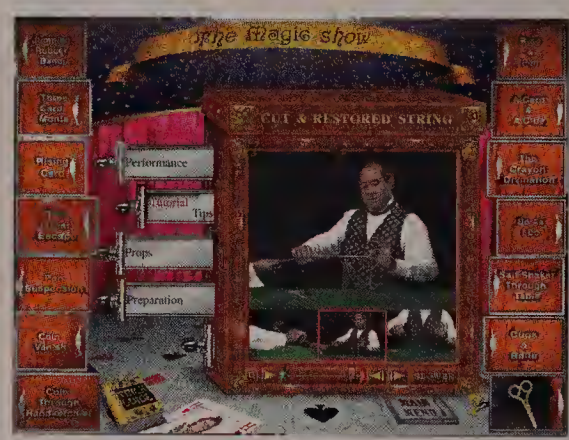
Two delightful add-ons hint at how good this package could have been. One is a button that prints out tickets and box-office posters for your neighborhood magic show. The second is a kit with six plastic props, a couple of which are fresh and interesting.

Table Magic

Anthony Lindan hosts Table Magic, volume 3 in Arc Media's Magician's Secrets series. Next to Jay Alexander, he's low-key and not irritating at all.

The other CD-ROMs I reviewed contain only the most basic tricks; such chestnuts as "guess the crayon color" and "levitate the pencil" appear on both. Lindan sidesteps the danger of offending the magic community more creatively—by teaching tricks he made up himself. Some are witty and mystifying; some (such as the one where he makes a coin vanish via Scotch tape on his palm) are easily guessed. But Lindan deserves points for making the extra effort.

The shortage of tricks—there are only ten—is unfortunate. So is Lindan's tendency to interrupt himself (he's working without a script). Otherwise, this CD-ROM is clean and effective. One QuickTime movie shows the trick; another shows how it was done. Text on the screen emphasizes the importance of presentation and patter. While the other discs I reviewed are aimed exclusively at kids, this straightforward, more intellectual disc is for grown-ups as well.



An Insider's View In Magic: An Insider's View, you can click on any of the three smaller movie images while the movie is playing; that view immediately fills the larger top screen.

Magic: An Insider's View

The producers of Magic: An Insider's View (from HarperCollins Interactive) went to the considerable expense of hiring TV actor Harry Anderson to host the show. Unfortunately, his unfunny antics add little; he returns to the screen 98 times or so in a tiresome running gag about attempting to escape from a straitjacket. Fortunately, you can skip over his segments with a click of your mouse.

If you do, you'll be rewarded. The real magician demonstrating each effect—who, for some reason, is uncredited—is terrific. His patter is witty, his manner is likable, and he performs (and explains) the 14 tricks clearly enough to compensate for the movie window's diminutive proportions. He's such a showman that he makes even these simple tricks look impressive—a worthy lesson in itself.

At any time during the explanation of a trick, you can switch among three camera angles. You can even play the movie at half speed if you want a closer look at a particularly tricky move.

The Last Word

Learn the Art of Magic offers many more tricks than do its rivals, but Jay Alexander is less likely to have you pulling a rabbit out of a hat than putting your fist through the computer screen. Although Table Magic offers fewer tricks, the ones it has are original and lack a slathered-on entertainment layer. For the mainstream, Anonymous the Magnificent (on Magic: An Insider's View) is the most likely to make a magician out of you; his tricks will stay with you long after Harry Anderson has finished squirming around in his straitjacket.—DAVID POGUE

Learn the Art of Magic

RATING: ★★/4.4 **PROS:** Lots of tricks; includes props. **CONS:** On-camera magician is unbearably irritating; little emphasis on presentation. **COMPANY:** Brøderbund (415/382-4700, *webmaster@broder.com*). **LIST PRICE:** $35.

Magic: An Insider's View

RATING: ★★★★/7.0 **PROS:** Superb on-camera magician; choice of camera angles; great use of QuickTime. **CONS:** Stale between-trick segments. **COMPANY:** HarperCollins Interactive (212/207-7000, *interactive@harpercollins.com*). **LIST PRICE:** $39.95.

Table Magic

RATING: ★★★/6.6 **PROS:** Original tricks; emphasizes learning over entertainment. **CONS:** Few tricks; host is sometimes inarticulate. **COMPANY:** Arc Media (416/410-4429, *arc@io.org*). **LIST PRICE:** $19.95.

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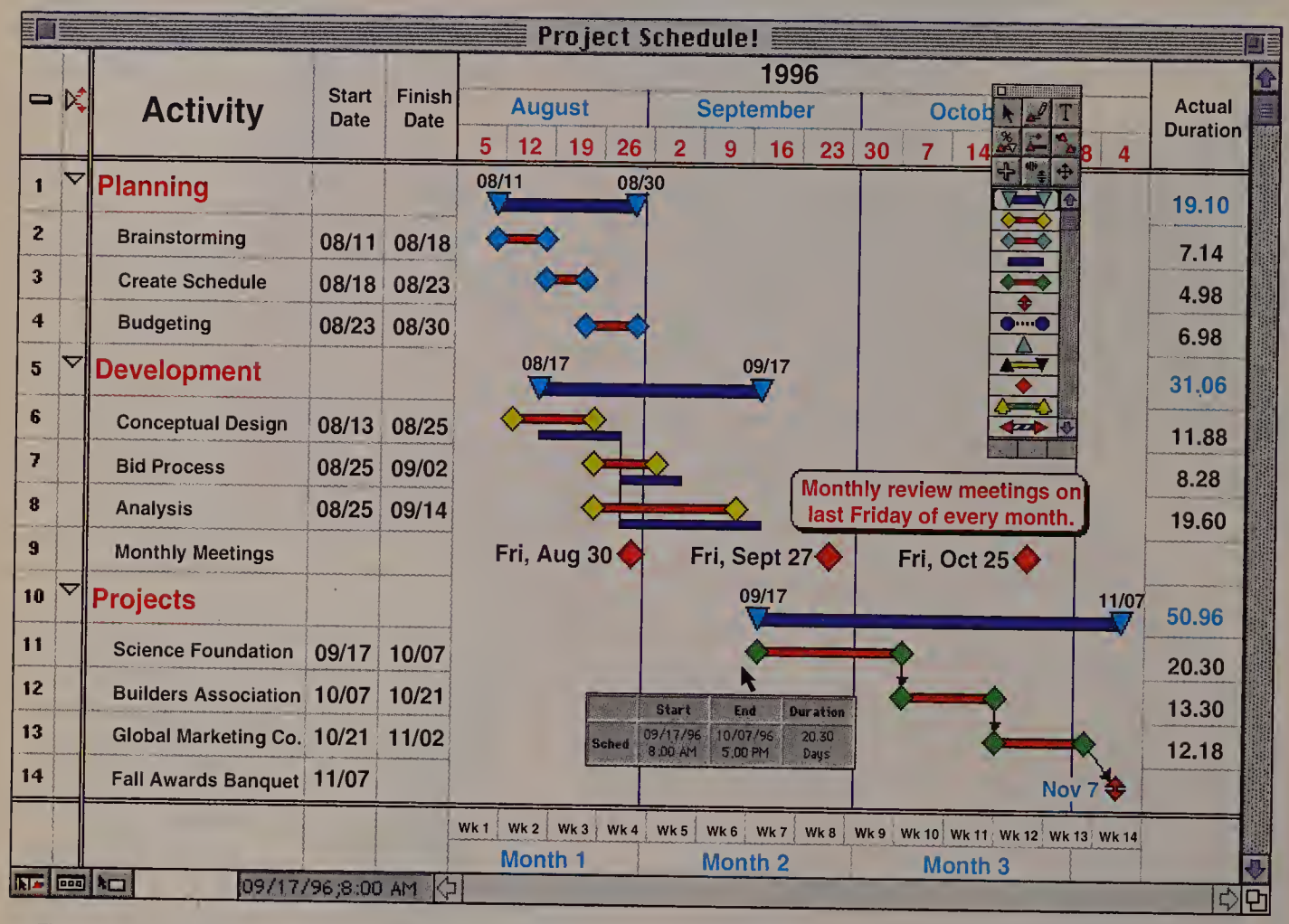

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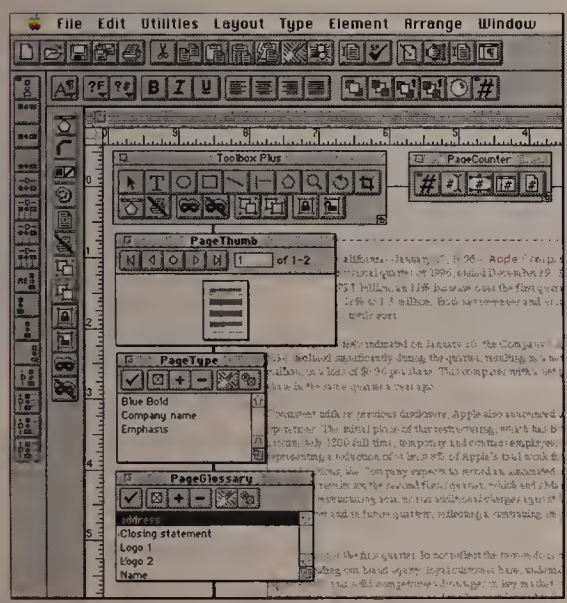
PageTools 2.0

PLUG-INS ADD POWER AND PRECISION TO PAGEMAKER

EXTENSIS HAS MADE A BUSINESS OF adding long-desired features to Adobe PageMaker and QuarkXPress. Its latest effort, PageTools 2.0, beefs up PageMaker 5 and 6 with 18 plug-ins that either add new features or enhance existing ones.

Most of the eight brand-new tools improve PageMaker's text-handling capabilities. PageType, for example, is a floating palette that lets you define and apply character-based styles (PageMaker supports only paragraph-based style sheets). You can include or exclude formatting attributes; for example, you can create a style that applies a specific color, size, and tracking to selected text but leaves the font untouched. The only disappointment is that you must have the PageType palette open to apply character-level styles. You can't access them through a pop-up menu or PageTools tool bar, nor by assigning them a keystroke or button.



Tool Time PageTools 2.0 turns PageMaker commands into buttons on tool bars or floating palettes, but the full array can make for a crowded screen.

Two other welcome text-handling tools are PageCounter and PageCaps. PageCounter is smarter than your average word-count utility; you can tell it to include or exclude nonprinting text, overset text, and text on the pasteboard. PageCaps lets you quickly change the case of selected blocks of text.

One of the more powerful tools is PageGlossary, which adds a text-macro function. You can store frequently used chunks of text or graphics and retrieve them later from the PageGlossary palette. As with the PageType tool, though, you can only select a PageGlossary entry from the floating palette; you have to either keep the palette open, or open it each time you want to use an entry.

Also new are PageMarks, which lets you draw crop marks and registration marks around objects; PageScaler, which lets you select and scale multiple objects; PageTabs, a palette that stores tabs and indents so you can apply them to other paragraphs; and PageTips, an innocuous tip-a-day screen.

PageTools also includes the ten tools that came with version 1.0. Among the best of the originals: PageMover lets you copy or move selected items from one page to another without actually going to the new page; PagePrinter enables you to print noncontiguous pages or only pages that have been modified; the PageThumb palette lets you navigate a document by clicking on page thumbnails; and PageZoom allows you to zoom in on part of a screen (in a separate window) without redrawing the entire screen.

As in other Extensis products, you access all the plug-ins from tool bars and floating palettes. The tool bars are now fully customizable; you can move buttons from bar to bar in any configuration, and create custom buttons that activate PageMaker commands. You can also anchor each tool bar to the top or side of your screen, or configure it as a floating palette. PageTools' full array of tool bars and palettes is visually overwhelming, however (see "Tool Time"); you'll want to customize them to eliminate the buttons you don't use and group the ones you do.

The Last Word

Extensis has done a good job of figuring out what PageMaker users really need. Some components are less elegant than others, but overall PageTools goes a long way toward making PageMaker more powerful and precise.—JOSEPH SCHORR

RATING: ★★★★/7.0 **PROS:** Fully customizable tool bars; adds character-based styles; glossary tool stores frequently used text and graphics; intelligent word-count tool. **CONS:** Palettes can crowd smaller monitors; you must keep palettes open to access character styles and glossary entries. **COMPANY:** Extensis (503/274-2020, *info@extensis.com*). **LIST PRICE:** $99.95.

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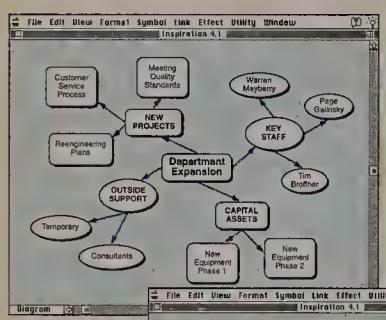

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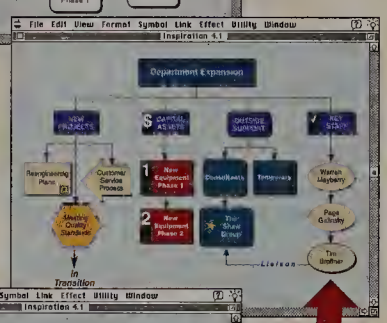

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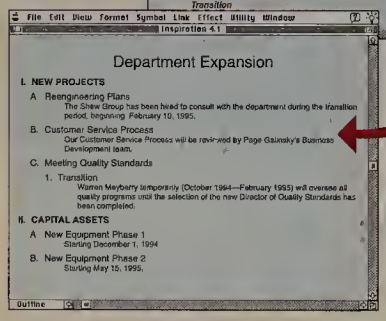

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EasyPhoto Reader

SMALL-FORMAT SCANNER HAS ITS LIMITS

ALTHOUGH MANY FLATBED SCANners are now within home and small-business users' budgets, sometimes they're a bigger tool than the job requires. If the main reason you want a scanner is to get photos onto your Mac, Storm Software's EasyPhoto Reader seems like a promising alternative.

The EasyPhoto Reader offers many of the same features as a full-size scanner, including 24-bit photo-realistic color and resolution as high as 1200 dpi. But unlike flatbed scanners, the EasyPhoto Reader has about the same footprint as a typical modem or removable-media drive, so desk space isn't a big concern.

The brief manual is intended only as a quick-start guide. The *real* documentation is provided online via Apple Guide, but poor indexing can make it difficult to find some topics. For example, the software includes a Photoshop plug-in, but the Apple Guide index and search commands have no listings for *plug-in* or *Photoshop*.

GIBSON

The EasyPhoto software scans and edits images, and can present the resulting photos as a slide show. Images are stored in galleries, which you can add to by scanning, reading images from Photo CDs, or importing photos from other programs. You can also add photos directly to a gallery via drag and drop, and place photos into programs that have drag-and-drop support. Although the program can import most major graphic formats—including TIFF and GIF—it can only save scans in PICT or JPEG format.

Scanning is straightforward: if you can use a photocopier, you'll have no trouble with the EasyPhoto Reader. Unfortunately, because most photos are smaller than the 5-by-7-inch image area, you have to use the cropping tool to remove the gray area around the image.

Few users will be satisfied with their unedited scans. My tests were muddy-looking and frequently marred by long horizontal lines, caused by specks of dust or calibration problems. The brightness and contrast tool helps you obtain a more acceptable image. Other tools enable you to make regular and irregular selections, zoom in or out, rotate the image, adjust colors, and eliminate scratches and the red-eye effect caused by a flash. Most tools show a preview before applying results to the image. If you can't remember what a tool does, let the cursor rest over it and a text description pops up.

Although the software remembers the last settings for each tool, they have no effect on future scans. Editing is therefore almost always required.

The Last Word

The documentation implies that you can scan picture after picture and pop the images into greeting cards and newsletters. Although you *can* do this, you probably won't be delighted with the results.

Though the consumer-level EasyPhoto Reader is indeed easy to use, the scans often require significant editing before they're acceptable, and the provided software isn't always up to the task. In no instance was I able to achieve results with the EasyPhoto tools that could match a quick tweak with Photoshop's Levels and Sharpen tools. And because the device must move the photos past the scan head, dust is considerably more of a problem than with a flatbed scanner. If you want to be happy with your scans, you have two choices: budget for a better editing program or spend that extra money on an inexpensive flatbed scanner bundled with Photoshop LE.—STEVE SCHWARTZ

RATING: ★★★/5.4 **PROS:** Easy-to-use software; editing tools provide preview of changes; drag-and-drop support; small footprint. **CONS:** Unedited scans are muddy and require cropping; scan head is susceptible to dust; saves photos only in PICT and JPEG formats. **COMPANY:** Storm Software (415/691-6600, *info@stormsoft.com*). **COMPANY'S ESTIMATED PRICE:** $259.

OneClick 1.0.1

BUTTON-BASED UTILITY LACKS POLISH

GIVEN CE SOFTWARE'S LONG-standing neglect of QuicKeys and the current popularity of launch strips, the appearance of Westcode Software's OneClick—a full-fledged, button-based macro program—is no surprise. OneClick offers floating button palettes for virtually every purpose: Launch Strips for quick file, folder, and application opening; a Task Bar for switching among or quitting applications; and button palettes for performing almost any task with a single mouse-click.

OneClick's Task Bar automatically lists all open applications, can hide background programs when you switch applications, and can "dock" in any corner of the screen. Launch Strips automatically expand to hold buttons created by dragging files, folders, or programs onto the strip. Conveniently, you can drag and drop a file onto an application button to open that file, and you can select folder contents or application documents from Launch Strip pop-up menus.

Buttoned Down You can color-code OneClick's multipurpose palettes and collapse them into small title bars or icons (far right) when not in use. Palettes shown here are colored gray for application (QuarkXPress), beige for universal availability, and blue for Launch Strips.

But OneClick is much more than a full-featured file launcher; with its customizable palettes and scriptable buttons, it can add versatile tool bars to any application. The bad news is that OneClick provides script-averse users far too few ready-made buttons and palettes. Altogether, OneClick's current offerings cover only common system and Finder functions, basic commands for just six applications—QuarkXPress, Canvas, ClarisWorks, MacWrite Pro, FileMaker Pro, and SimpleText—and a handful of useful utilities-in-a-button (a pop-up calendar and a glossary, for example).

Script-savvy users will appreciate OneClick's power (see "Buttoned Down"). You can create, resize, and color palettes; specify background patterns or graphics; add title bars; and arrange buttons. You can copy predefined buttons from OneClick's button library; create them from scratch; or rework existing ones by resizing, coloring, or redrawing them. You can give buttons names instead of—or in addition to—icons, specify pop-up help captions, and assign keyboard equivalents.

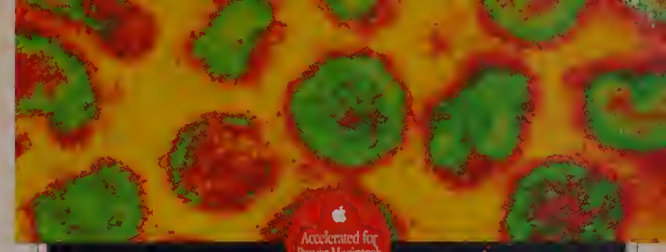
To make buttons do your bidding, you use EasyScript, OneClick's scripting language. For straightforward tasks, OneClick's "watch-me" recording mode is easy and effective; for complex tasks, some scriptwriting experience is a must. Fortunately, OneClick's script editor is kinder and gentler than most. EasyScript's macro and button skills run the gamut, from selecting menu commands and dialog-box options to creating pop-up menus, status boxes, toggle buttons, and tear-off palettes. AppleScript aficionados, take note: EasyScript can launch independent AppleScripts, or you can embed AppleScript code into an EasyScript routine.

As with many initial releases, OneClick has some shortcomings: collapsed and expanded palettes sometimes don't stay put (and the number of collapse/expand options is confusing); status bars on narrow, vertical palettes uselessly display only two or three letters. And the bugs aren't limited to aesthetics: Undo rarely works in the OneClick Editor; screen redraw problems sometimes occur; and on one occasion OneClick completely lost track of several palettes.

The Last Word

Despite some rough edges, OneClick is an inventive combination of launcher and macro utility. With the addition of comprehensive palette and button libraries and some fine-tuning, it could be a real winner.—ROBERT C. ECKHARDT

RATING: ★★★/5.1 **PROS:** Versatile scripting language; fully customizable palettes and buttons; full-featured launcher. **CONS:** Meager predefined button and palette collections; rough edges need polishing. **COMPANY:** Westcode Software (619/487-9200, *westcode@westcodesoft.com*). **LIST PRICE:** $129.



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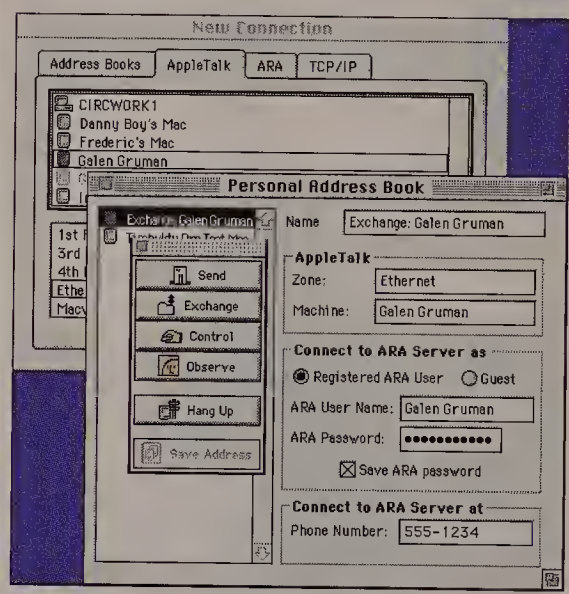
Timbuktu Pro for Networks 2.0

FARALLON'S OLD STANDBY GETS A HO-HUM UPGRADE

FARALLON'S TIMBUKTU REMOTE-control and file-sharing software has always let you run a Mac server remotely, share files with a different system, and troubleshoot a user's system from your desk. The latest version, Timbuktu Pro for Networks 2.0, continues to offer these fundamental features and adds a few bells and whistles. However, most Timbuktu and Timbuktu Pro users needn't bother upgrading; the new features aren't compelling.

The addition of the "for Networks" moniker is merely a marketing twist; the product has always supported networks. The biggest change in Timbuktu Pro 2.0 is support for Novell's IPX protocol—a must if you're on a NetWare network. A new Flash Notes feature lets you send messages to the screens of other Timbuktu 2.0 users; users of earlier versions get a text file they can open using SimpleText. Timbuktu Pro 2.0 also adds the ability to drag and drop files from your desktop to the remote Mac's or PC's desktop—a useful addition.



Making a Connection Timbuktu's new tabbed panes provide access to connections over a variety of networks. With Personal Address Books, you double-click on an address and let Timbuktu do the rest.

Also new is the inclusion of Apple Remote Access (ARA) client software and the ability to save ARA connection setups—along with setup files for AppleTalk, TCP/IP, and IPX connections—in a personal address book. The address book is merely a new way of saving network connections, which Timbuktu could always do.

These two new features—ARA support and address books—aren't enough to make the latest version a must-have. Although it's convenient to be able to start and disconnect an ARA session from within Timbuktu, I'd really like Timbuktu to provide truly useful ARA integration, such as the ability to reconnect a connection if it gets cut off rather than having to start from scratch.

Similarly, the address books don't provide much more than the basics. You can save a connection in an address book and easily reestablish a connection to that particular system later, but you can't define a destination and then tell Timbuktu what action to take: control, observe, send files, or exchange files. Instead, you have to define a separate connection for each scenario—such as exchanging files with your work Mac or observing the actions of a database server—that defines the destination system, the connection protocol, *and* the action to be taken. I'd much prefer, for example, to be able to save a connection to a given system, select that location later, and then click on the appropriate button to determine what action I want to take.

Two minor changes round out Timbuktu Pro's new offerings. The package is now Power Mac native—although I did not notice any performance difference—and a new interface uses floating palettes and a Windows 95 look.

The Last Word

If you need to control a Mac remotely or exchange files with a nonlocal system, you're probably already using Timbuktu and ARA. If you aren't, or if you're working in a Novell NetWare environment, get Timbuktu Pro for Networks 2.0. Otherwise, stick with what you have; the changes here aren't worth the $100 upgrade price.—GALEN GRUMAN

RATING: ★★★/5.5 **PROS:** Adds NetWare IPX support; includes Apple Remote Access client. **CONS:** Improvements in interface, features, and integration are minor. **COMPANY:** Farallon Computing (510/814-5000, *info@farallon.com*). **COMPANY'S ESTIMATED PRICE:** Single-user $139; 2-user pack $189; 100-user pack $3999.

Brother MFC-4000ML

MULTIFUNCTION DEVICE'S TOP-NOTCH FAX FEATURES MARRED BY TOUCHY PRINTING

THE BROTHER MFC-4000ML COMbines a top-of-the-line fax machine with a photocopier and a 300-dpi laser printer, but problems with Mac-based printing overshadow the MFC-4000ML's extensive faxing capabilities.

Putting It All Together

Because the MFC-4000ML is a multifunction device, you have to assemble more components than you would on a standard printer. The assembly diagrams in the manual are tiny, but an included videotape contains excellent step-by-step instructions.

The fax features of the MFC-4000ML rival those of any top-notch fax machine. It comes complete with speed dialing, security, memory, and image-quality options, and you can connect an answering machine to answer your voice calls automatically. You can also make photocopies by inserting originals into the fax-sending slot. Unfortunately, although the MFC-4000ML's hardware offers modem and scanning capabilities as an optional upgrade, they're Windows-specific and can't be accessed using its Mac software.

Printing as a Contact Sport

To use the MFC-4000ML as a printer, you have to buy an optional $89 Macintosh serial interface kit. This includes a disk with five TrueType fonts, and a replacement for Apple's PrintMonitor program. Because the MFC-4000ML is not a PostScript printer, you'll need to use TrueType fonts, exact-size screen fonts, or ATM to get high-quality text output.

In addition to standard and gray-scale modes, the driver offers a useful economy mode that uses only half the usual amount of toner.

The print dialog box offers on-screen help, as well as options for selecting manual-duplex (two-sided) printing and changing the current document's time-out setting—the amount of time the printer will wait for data before canceling the job. Since the MFC-4000ML has no on/off switch, its automatic sleep mode helps it consume less energy.

On my test system, background printing was a problem: the system crashed, the spooler lost contact with the printer, and pages sat unprinted in the unit's memory—waiting for me to eject them forcibly by pressing a button on the front panel. Turning off background printing eliminated the crashes, but not the remaining problems. Macworld Lab duplicated the former problems—but not the system crashes—in a controlled environment, especially with medium-size jobs of 10 to 15 pages.

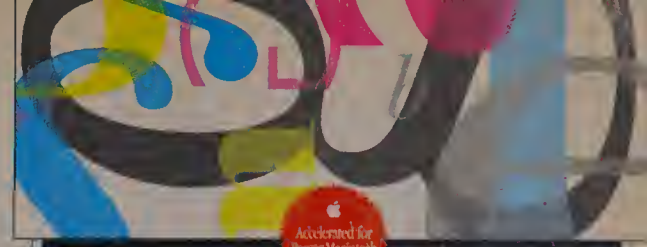
ROBERT PERRY

In an attempt to troubleshoot my printing difficulties, I called Brother's toll-free support number. Six hours of busy signals later, I gave up and placed a toll call to the company's main number. After 53 minutes on hold—with no chance to request a call back—I hung up.

The Last Word

Based on my experiences, I cannot recommend the MFC-4000ML as a Mac-based printer. On the other hand, if you're mainly looking for a high-end fax machine, the MFC-4000ML adds copying and laser printing at a reasonable price.—STEVE SCHWARTZ

RATING: ★★/4.0 **PROS:** Extensive fax options; simple copy procedures; sleep mode; auto-switching between Mac and PC platforms when printing; toner-saving print option. **CONS:** No on/off switch; modem and scanning features not available for the Mac; difficult to obtain support. **COMPANY:** Brother International (908/356-8880). **COMPANY'S ESTIMATED PRICE:** $1000, plus $89 for Mac interface.



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File Size	PowerCADD 2.0	PowerDraw 6.0	PowerDraw 5.0
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6.4 MB	5.49	18.12	38.25
1.0 MB	1.68	3.87	7.87

*Test conducted on a Power Macintosh 8100/100AV for PowerCADD 2.0 and a Macintosh Quadra 630 for PowerDraw versions.

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"...PowerCADD's greatest benefit is speed..."

"PowerCADD does the best job of harnessing the Power Mac's capabilities I've seen."

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"...PowerCADD's programmability and extensibility may make PowerCADD a better choice than high-end CAD programs."

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MacWEEK July 10, 1995

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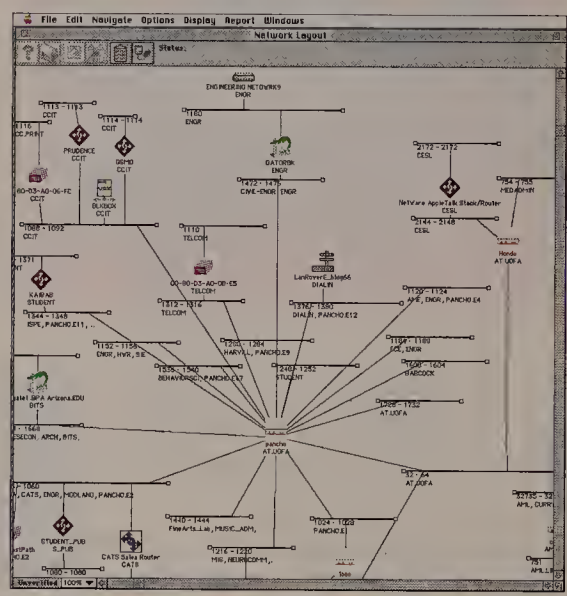
LANsurveyor 3.0

ROAD MAP TO YOUR NETWORK

LANSURVEYOR HELPS NETWORK managers map, monitor, and troubleshoot AppleTalk networks. For medium-size to large networks, LANsurveyor can pay for itself in the time and aggravation it saves.

LANsurveyor graphically displays AppleTalk network segments, the routers between them, and (if requested) the nodes on each segment. LANsurveyor uses this map to monitor the network, and sends out warnings when it recognizes a problem. LANsurveyor's map also serves as a graphical control board for launching other network-management tools.

LANsurveyor builds its graphical network map using AppleTalk's internal routing protocols. LANsurveyor draws individual networks as lines and places icons between them to represent routers. Networks with LAN-to-LAN links show up beautifully in the map; you need to make WAN links manually. You also have to enter a lot of TCP/IP configuration information manually, though a new feature helps the program auto-discover the IP addresses of AppleTalk devices.



Mapped Out LANsurveyor made short work of this 150-zone AppleTalk network, discovering the topology and mapping it in less than an hour. I never knew what it looked like until LANsurveyor showed me.

For very large networks, the LANsurveyor map is somewhat awkward. You can move things around to make the map more readable, but this can be dangerous: whenever you add a new zone or verify the map topology, LANsurveyor rebuilds the map, and you lose your layout customizations. You can break a large network into smaller segments since the default map works well at a smaller size.

LANsurveyor can monitor any object on a map. If AppleTalk error rates get too high or if a system is unreachable using TCP/IP or AppleTalk, LANsurveyor alerts the network manager by playing sounds, showing dialog boxes, and sending E-mail or pages (a new feature, via Mark/Space Softworks' PageNow). I found monitoring a bit daunting: after setting different alarm thresholds and alerts for a couple dozen devices, I ended up with 14 open windows, making it hard to keep track of things. LANsurveyor also doesn't send mail directly via TCP/IP—you have to go through PowerTalk or CE Software's QuickMail; other E-mail packages and SMTP are not supported in this release. Alarms also don't affect the map; I'd like to see devices turn yellow or red in alarm state.

One feature I really like lets you point to a network segment and ask LANsurveyor to make a list, in a separate window, of all the devices on that segment. This feature highlights one of LANsurveyor's strengths—as a starting point for troubleshooting a problem.

LANsurveyor also lets you associate applications with objects. For example, I easily set up LANsurveyor to launch the management application for Cayman Systems' Gatorbox routers whenever I click on the map's Gatorbox icon.

LANsurveyor now supports SNMP queries of objects. Double-click on an object, and LANsurveyor gives you all available SNMP data: network interfaces and addresses, routing tables, error counts, and even installed software and hardware.

The Last Word

For mapping networks, giving the AppleTalk manager a feel for how things are put together, and acting as a master control panel for the network, LANsurveyor is an excellent tool. As a network-monitoring tool, LANsurveyor is adequate but still needs some work.—JOEL SNYDER

RATING: ★★★/6.4 **PROS:** Valuable tool for any AppleTalk network manager; gives a big-picture view. **CONS:** IP support is limited; monitoring facilities need more development. **COMPANY:** Neon Software (510/283-9771, *info@neon.com*). **LIST PRICE:** Five zones $395; unlimited zones $695.

RedShift 2

EXPLORE SPACE FROM ANY PLANET

GOOD ASTRONOMY PROGRAMS used to show you what the sky looks like from any place on Earth at any time. A newer breed, exemplified by RedShift 2 from Maris Multimedia, lets you leave Earth and view objects in space from anywhere in the solar system. In addition, RedShift provides scads of photographs and movies and even an astronomical dictionary, all in a nicely integrated package.

At the heart of RedShift is a sky simulator that shows 250,000 stars, 40,000 deep-space objects, and all major solar-system bodies (including more than 5000 asteroids and comets). The sky simulator comes complete with constellation names and outlines, a selection of coordinate grids, and filters to display only the kinds of objects you want to see. The software's accuracy is exceptional; for example, it faithfully reproduces the ultraclose conjunction of Jupiter and Venus in 2 B.C. that is often identified with the Star of Bethlehem. Twenty tutorials offer intriguing places to launch explorations.

Earth from Mars View any planet or moon from any other. Here's Earth (center, between arrows) as it will appear from Mars on July 4, 1997.

Useful subprograms include Conjunctions Finder and Eclipses Finder, which find and simulate planetary conjunctions or eclipses within a range of dates that you specify. Planetary Reports charts the planets' visibilities (distance, illumination, magnitude, diameter, and elongation from the Sun) over the course of a year. And the Movie Recorder lets you easily generate a QuickTime movie of planetary motions or an eclipse.

The real excitement begins when you leave Earth. You can view objects from anyplace on the surface of any planet or from any moon, asteroid, or comet. I wondered what the NASA spacecraft *Pathfinder* would see when it lands on Mars on July 4, 1997. So I went to Maps, selected Mars, searched the list of named features to find the landing site—Ares Vallis—and set it as my observing location. I entered the date, and saw Earth in Pisces between Jupiter and Saturn. You can also view from orbit or from a moving asteroid or comet. I especially enjoyed riding comet Hale-Bopp, which is expected to become quite bright next year, and seeing the planets pass by from its perspective as it rounded the Sun.

An extensive suite of photographs and videos—alone worth the price of the package—complements the sky simulator. Ten short movies effectively explain basic principles of astronomy (although the narrator could pick up the pace). An extensive, well-curated photo collection, gathered from NASA and the world's great observatories, has 500 full-screen photographs of planets, moons, comets, eclipses, stars, star clusters, nebulae, galaxies, telescopes, and more. The 20 short astronomy videos (30 minutes total, many narrated) are worth watching once.

The inclusion of the authoritative and illustrated *Penguin Dictionary of Astronomy* is a nice touch. Throughout RedShift, hypertext links words to the dictionary, photo gallery, movie gallery, and tutorials. Astronomy students should find the dictionary and links particularly useful.

My only complaint is that the controls are cumbersome and un-Mac-like. It can be awkward to do some things that should be simple, such as adjusting your viewing direction. But once you learn this unconventional interface, it works.

The Last Word

A powerful planetarium program integrated with an extensive image collection results in a strong package. The only drawback is the awkward interface. Any Mac owner seriously interested in astronomy should own RedShift 2.—JOHN MOSLEY

RATING: ★★★★/7.5 **PROS:** Powerful and accurate sky simulator, extensive photo collection, and astronomy dictionary—all nicely integrated. **CONS:** Complicated un-Mac-like controls. **COMPANY:** Maris Multimedia (415/492-2819, *redshift@maris.com*). **COMPANY'S ESTIMATED PRICE:** $54.95.

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MW ★★★★ MacWorld 1995

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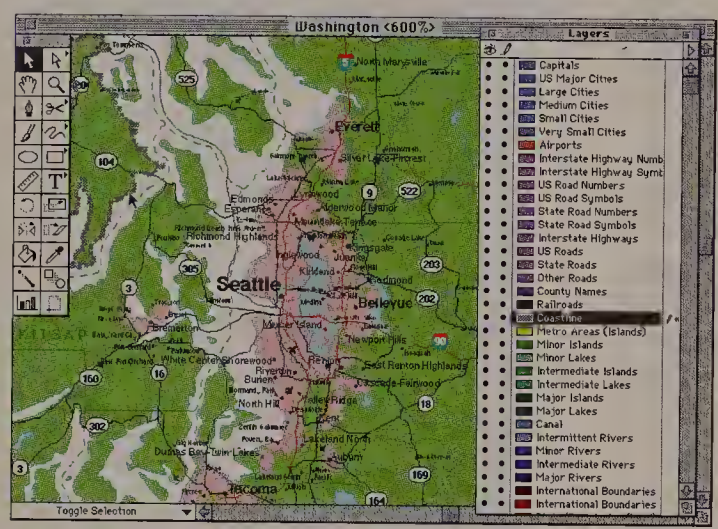
MapArt

DETAILED, EDITABLE MAPS SPICE UP YOUR LAYOUTS

NEED HIGH-QUALITY, ROYALTY-free maps to enliven your layouts? Look no further than Cartesia Software's new MapArt Cartographic Data Bank and updated MapArt Designer Series. These collections contain beautiful maps you can use as is or customize with Adobe Illustrator 5 or Macromedia FreeHand 5.

The latest in the series, Cartographic Data Bank is available in two volumes (CD-ROM only) and contains maps of considerable sophistication and detail. The USA volume covers all 50 states plus Canada, Mexico, and the Caribbean. The World volume's 200-plus maps include regional maps of the world and the United States, and individual maps of virtually every country. Map details such as city names, boundaries, rivers, and roads appear on different layers for easy editing.

A few of the largest Data Bank maps (some exceed 10MB) are compressed, but most can be used or edited right out of the box. For a few foreign countries and all U.S. states, the smallest-cities layer is stored in a separate file; latitude and longitude grids are also stored separately. You simply copy and paste the elements you need. More of a problem are the separately stored highway layers for all the World maps. These are organized on a grid of 10-degree squares, so for countries such as Mexico, which occupies parts of nine grid squares, adding roads is tedious. Fortunately, positioning pasted layers is no problem in Illustrator 5; the Paste in Front command aligns everything.



Finding Your Way Details in MapArt Cartographic Data Bank maps are sorted into layers, so it's easy to work on related items.

The World and USA volumes in the MapArt Designer Series have been updated to reflect current political boundaries. The content is much the same as before: the World volume has a variety of world projections and globes, 58 regional maps, and 30 country maps, while USA has maps of counties and major highways for each of the 50 states, plus 7 national maps showing such features as zip code regions and congressional districts.

The Designer Series now includes a complete set of files in Illustrator 5 format in addition to the earlier version's Illustrator 1.1 and FreeHand 3 files. Because the Designer Series maps are far less detailed than those in the Data Bank, the number of layers is limited and, thankfully, some layers aren't in separate files. State maps in the USA volume can be combined to create regional maps, but country maps in the World volume are stand-alone, complete with borders and legends.

Unfortunately, only the Designer Series contains preassembled U.S. maps; both Data Bank and Designer Series lack detailed U.S. maps. Some of Data Bank World's country maps lack the detail found in USA's state maps and the fine precision found in the best print atlases.

The Last Word

The contents of Cartesia's map cabinet may appear expensive compared with clip art, but they're a bargain compared with the cost of hiring a cartographer. And this is no clip art—these are the most professional, versatile, beautiful Mac maps in the hemisphere.—ROBERT C. ECKHARDT

MapArt

Cartographic Data Bank ★★★★/8.5

Designer Series ★★★★/7.8

PROS: Maps are beautiful, intelligently layered, and usually easy to use. **CONS:** U.S. maps not detailed enough; adding road layers in Data Bank World can be a chore. **COMPANY:** Cartesia Software (609/397-1611). **LIST PRICE:** Cartographic Data Bank $249 per volume, $399 for both; Designer Series $129 per volume, $199 for both.

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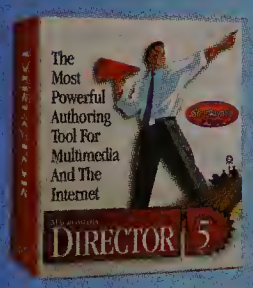

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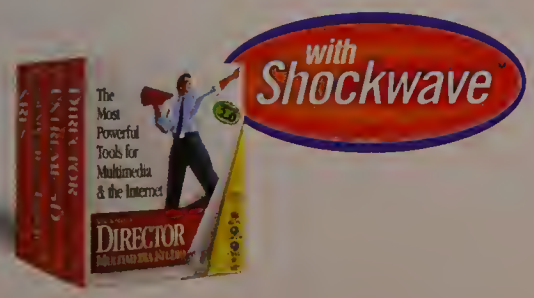

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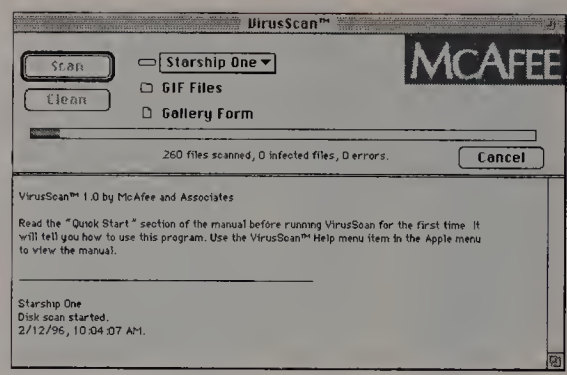
McAfee VirusScan

DETECTION PACKAGE LACKS FEATURES

LONG A POPULAR PRESENCE IN the PC antivirus world, McAfee Associates now brings us VirusScan, its first Mac product. Rather than write a new program from the ground up, McAfee licensed source code from John Norstad's Disinfectant, a freeware program. Although this approach got VirusScan to market quickly, it has some disadvantages.

VirusScan consists of an application that scans your drives for possible infections and a system extension that provides an audible alert and on-screen message if a virus attempts to infect your Mac. VirusScan also forces infected programs to quit so they can do no further damage.

When you install the program, it offers to check your drives for virus infections before it actually installs any files. It's here that I encountered my first problem: Every time I tried to run this preinstallation scan, the program would quit. Although the solution was fairly simple—I had to allocate more RAM using the Get Info command—implementing it wasn't. Since the installation disk was permanently write-protected, there was no way to fix the problem on the master disk. I had to copy the files to another disk to make the change.



Any Viruses Present? As part of its installation process, the VirusScan application can check your Mac's drives for the presence of virus strains.

Compared with Symantec's SAM and DataWatch's Virex, VirusScan lacks several important features. You can update both SAM and Virex by simply installing new detection files downloaded from online services or provided by the vendor. VirusScan has to be upgraded to recognize newly discovered viruses. And unlike its competitors, VirusScan cannot check for Trojan horse viruses, like the various Microsoft Word macro viruses that have surfaced in recent months.

Both SAM and Virex speed things up by using data files that track files already scanned—after the initial examination, they only have to check for new or changed files. VirusScan has no similar feature; it runs a full scan each time—especially time-consuming if you have lots of files or several drives installed. VirusScan also lacks scheduled scans and password protection.

McAfee's technical support doesn't win any brownie points, either. Repeated toll calls over a two-day period failed to reach a representative. Finally, on the afternoon of the third day, a representative called back and gave me the solution I had already discovered for myself.

The Last Word Disinfectant provides virus protection sufficient for many Macintosh users, uses little memory, and runs stably and predictably. VirusScan doesn't rate so well in relation to its competition in the marketplace. If you want no-frills virus protection, save your money and get a copy of Disinfectant, or spend a few more bucks and get the full-featured protection of SAM or Virex.—GENE STEINBERG

RATING: ★★/4.6 **PROS:** Simple interface; modest memory needs; decent performance. **CONS:** Offers little benefit over freeware Disinfectant; lacks important features; difficult to reach technical support. **COMPANY:** McAfee Associates (408/988-3832, *support@mcafee.com*). **LIST PRICE:** $65.

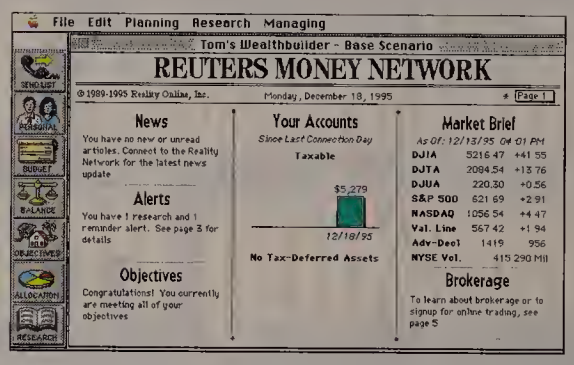
WealthBuilder 4.01

FINANCIAL PLANNER DOESN'T ADD UP

CHANCES ARE, IF INVESTMENTS ARE part of your financial picture, Reality Online's WealthBuilder can help you manage your portfolio and meet your financial goals. Based on your personal information—budget and balance sheet, tolerance for investment risk, existing investment portfolio, and short- and long-term financial objectives—WealthBuilder helps you develop a personal financial plan, manage your portfolio, and buy and sell investments online.

Entering all this data into WealthBuilder is a chore; when you're completing an on-screen form, you must often go to another form to fill in the details. You'll find yourself doing a lot of clicking to get your data into the program.

Once the data is entered, WealthBuilder uses the Reuters Money Network online service to track and update securities prices (Reuters is Reality Online's parent company). Subscriptions to the network range from $6.95 per month for continually updated stock, option, and mutual-fund quotes to $19.95 per month for quotes, monthly updates to a research database, access to a discount online brokerage, and a news feed of financial headlines. While this online service is theoretically optional, you'll need it to get electronic updates.



Money Building WealthBuilder presents you with a faux online newspaper that clues you in to the world's current financial status as well as your own.

Unfortunately, performance was at best leisurely and at worst glacial; downloading an updated database of mutual funds and stocks from the service took less than 5 minutes, but WealthBuilder required nearly 40 minutes to crunch the new data and add it to its database. During that time, my computer (a Power Computing Power 100) was completely tied up. I also experienced several crashes, usually when disconnecting from Reuters Money Network. The manual was little help in these situations; it often uses undefined terms, and the tutorials leave out some steps.

Once you've entered your portfolio and WealthBuilder has updated current stock prices, the program analyzes your goals from the standpoint of what it will cost to meet them. For example, it lets you know if you're undercontributing to your savings and investment program. It can also help you allocate funds among different investment vehicles, calculating how much you should invest based on the level of risk you selected earlier.

The Last Word Unless you're heavily focused on securities trading, particularly online trading, you may be better off with a personal finance program like MECA's Managing Your Money or Intuit's Quicken; not only do they let you deal with all your financial affairs in one place, they both now have extensive investment and financial-planning features. For most users, these programs make purchasing WealthBuilder superfluous.—TOM NEGRINO

RATING: ★★/4.9 **PROS:** Good selection and tracking of financial data; allows online securities trading. **CONS:** Cumbersome interface; buggy; time-consuming database updates; mediocre manual. **COMPANY:** Reality Online (610/277-7600, *tsupport@reality-tect.com*). **LIST PRICE:** $49.95; upgrades $29 95.

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cc:Mail is the most comprehensive e-mail system for the Macintosh. The new Release 3 features include: built-in AppleScript support which lets you drag-and-drop commonly used addresses, folders, and other objects to the desktop for easy accessibility; cc:Mail Rules which makes managing your e-mail easy by automating everyday tasks; and cc:Mail Viewers which let you view and print attachments even if you don't have the application with which they were created. When it comes to e-mail for the Macintosh, nothing is more complete or easier to use than cc:Mail.

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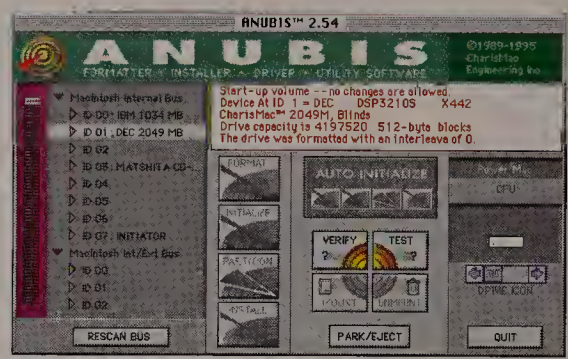
Anubis 2.54

RELIABLE, EASY-TO-USE DISK FORMATTER

ODDS ARE YOU'VE NEVER USED anything but Apple's HD SC Setup or Drive Setup utility to format your hard drives. But if you don't have an Apple hard drive (Apple's disk formatters work only with Apple drives) or you're looking to speed up your drive's performance, you may want to check out one of the third-party formatters. With CharisMac's Anubis, you can format most of the available SCSI and IDE hard drives as well as removable media.

You activate all of Anubis's features from a single program window, though you'll probably never stray beyond Auto Initialize (see "Doing It the Easy Way"). This single command checks the drive for defects, erases the data, installs the Anubis SCSI device driver, and lets you partition the drive into multiple volumes. You can also click on separate buttons to format, initialize, and partition a drive; update the SCSI device driver on your hard disk; verify and test a drive; and mount or unmount a device. Other nice touches are a Mounter extension that loads removable media on your Macintosh after it boots, and an array of hard-disk icons that you can assign to your drives.



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The Last Word With the quality of hard-drive formatters becoming consistently good overall, Anubis excels by offering a slick, easy-to-use interface and prompt, accurate, courteous technical support. Although its performance with IDE drives is less than perfect, I recommend Anubis without hesitation for SCSI drives and removable media.—GENE STEINBERG

RATING: ★★★/6.9 **PROS:** Easy drive initialization, formatting, and partitioning; reliable performance with SCSI drives and removable media; can work in the background on a Power Mac. **CONS:** Doesn't estimate how long formatting will take; lacks start-up disk; mediocre performance on PowerBook IDE drives. **COMPANY:** CharisMac Engineering (916/885-4420, *charismac@eworld.com*). **LIST PRICE:** $129.95

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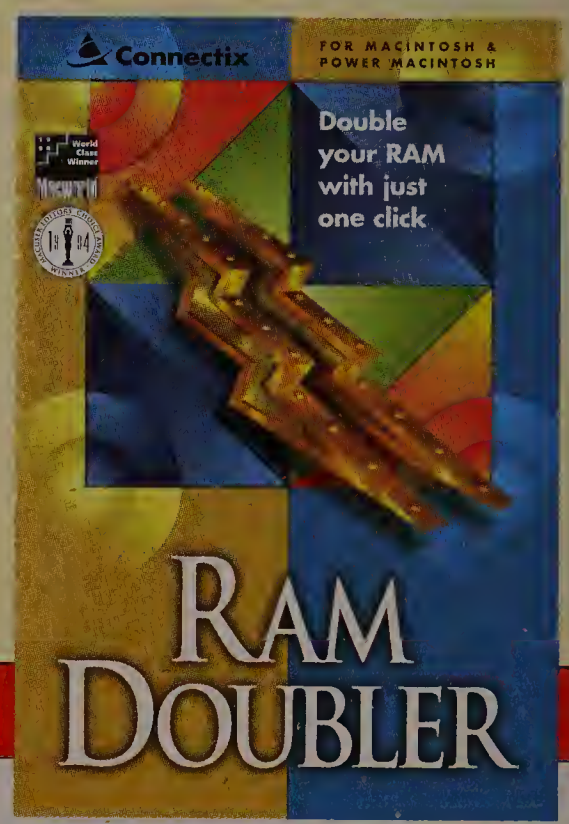
System Requirements: Macintosh equipped with a 68030, 68040 or PowerPC microprocessor. System 6.05 or later, including all versions of system 7 • 4 MBs required (hard disk required for machines with 4 to 6 MBs) • Not compatible with Mac SE, original Mac Classic, original Mac LC or PowerBook 100 or Mac II without a 68851 PMMU or any accelerator that does not work with virtual memory.



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TRACK 3 →

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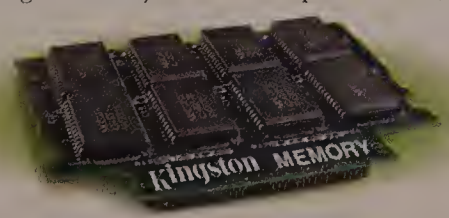

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Anubis 2.54

RELIABLE, EASY-TO-USE DISK FORMATTER

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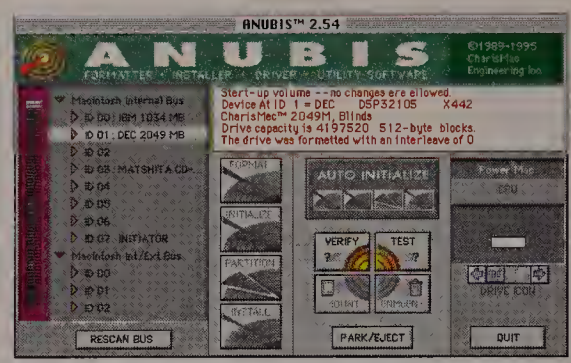

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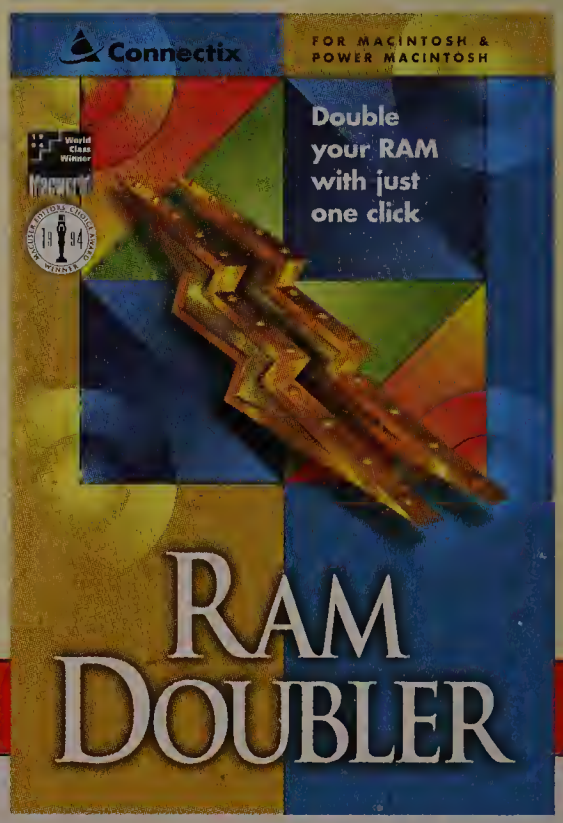

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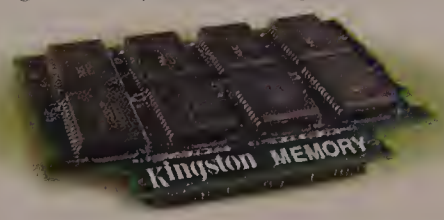

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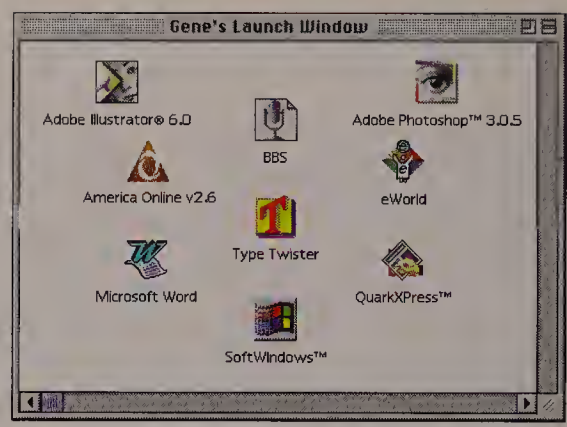
Mac Manager 3.1

SECURITY WITH A COPLAND-STYLE LOOK

LOOKING FOR A SECURITY PROgram with the appearance of Apple's next operating system? Mac Manager provides the look of Copland along with a set of features designed to keep unauthorized users away from your Mac, limiting access to hard drives, programs, folders, and files. Unfortunately, it has numerous rough edges.

In some respects, Mac Manager is reminiscent of Apple's At Ease for Workgroups, but it goes a lot further in terms of desktop security. Not only can you customize access to your Mac for individuals or groups, but you can also create comprehensive logs showing users' activities, from the programs they ran and how long they used them, to the amount of time spent printing and how many documents they printed. You can restrict users to specific applications and folders, and limit the amount of time they can use a Mac before they're logged off.

Mac Manager provides three custom desktop looks based on Copland themes: 3-D, Hi-Tech, and Kids. You can also create custom application- and document-launch windows that show users' accessible programs and files.



Mac in Sheep's Clothing In addition to providing security and controlled-access features, Mac Manager can create Copland-inspired launch windows.

Despite its attractive interface, Mac Manager has some strings attached. Don't attempt, for example, to disable the program's system extensions with an extension manager (such as Casady & Greene's Conflict Catcher). The results will be catastrophic: your Mac won't boot completely, even if you start up with extensions off. Similarly, the manual warns against moving or compressing Mac Manager's files because "Operating System Errors could occur." And if you want to optimize your hard drive, you must remove the program first, then reinstall after optimizing.

The manual is dry, a bit complex, and not very well illustrated. Both the manual and the product packaging promise E-mail functions that were not delivered in the version I reviewed (ELS claims they'll be added later this year).

Technical support was helpful and eager to please, pointing me to a program update that was supposed to fix the problems I experienced. But the update—and a few more provided during the review process—didn't fix all of the program's quirks: Conflict Catcher failed to run until I changed the start-up order of one of Mac Manager's system extensions; hard drive directories had to be reopened at every restart; and general system performance suffered when basic security options were enabled.

The Last Word Mac Manager has its attractions—both as a Finder replacement and as security software—but it will take a determined user to harness the power of this program.—GENE STEINBERG

RATING: ★★★/6.1 **PROS:** Attractive desktop look; good protection against unauthorized access. **CONS:** Buggy; overrestrictive setup and use requirements; dry, complex documentation; not all advertised features are implemented. **COMPANY:** ELS (352/375-0558, *elstech@elsinc.com*). **LIST PRICE:** $79.

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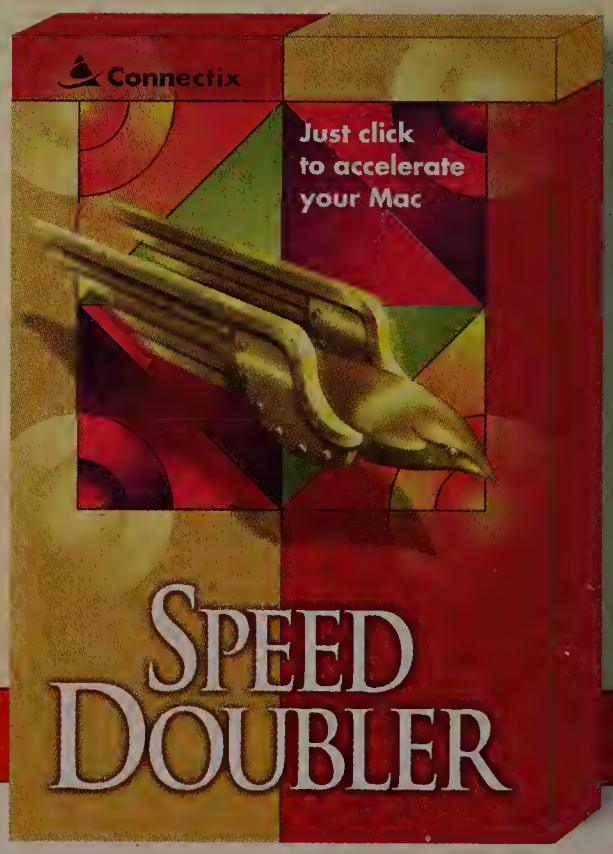
With Speed Doubler, Power Macs instantly run non-native applications twice as fast! For instance, recalculate a 5000 cell Excel 4.0 spreadsheet with Speed Doubler in 6 seconds, without it...13 seconds. Run a summary calculation of 1500 FileMaker Pro records in 90 seconds instead of 3 minutes. It's not magic. It's Connectix Speed Doubler. And if you own a Power Mac, you gotta have it. Get Speed Doubler today wherever fine computer products are sold. Your satisfaction is guaranteed.



Requirements: Macintosh equipped with a PowerPC, 68040 or 68030 microprocessor • System 7.0 or greater • 8 MB physical RAM or greater • Compatible with Connectix RAM Doubler • Not compatible with: Mac Plus, Mac SE, original Mac Classic, original Mac LC or PowerBook 100

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Fun With Electronics

MULTIMEDIA UPDATES A CLASSIC

ELECTRONIC CONSTRUCTION KITS have been around for a long time, but Philips Media has taken this old standard and updated it for the computer age. The Fun With Electronics CD-ROM effectively uses multimedia and cartoon characters to teach electronics basics and direct the construction of projects.

If you've wandered through an electronics store, you've probably seen Fun With Electronics' predecessor: a cardboard workbench with resistors, transistors, capacitors, and small springs serving as connectors to each component.

Fun With Electronics takes this basic model and adds multimedia to the learning experience. Along with the CD-ROM, you also get a real kit with working electronics components to build the projects illustrated on screen. Cartoon characters and an animated simulation of your workbench help you see each wiring connection as you make it, minimizing errors. Fun With Electronics also includes several dozen bits of trivia about electricity and electronics.

The program is divided into four sections. In Basics, a slide show explains the fundamentals of electricity and electronics. Behind the Scenes explains how common electronic devices work, including a radio and an electric guitar. Meet the Stars uses cartoon characters to introduce electronic components. After learning about them, you can take a quiz to see if you understand what each component does.

KEVIN CANDLAND

In the Pick Projects section you select any of 25 projects and then watch as the proper construction is shown on screen. Each connection is indicated in sequence by a flashing wire—color-coded by length—that shows which two springs are to be joined. Forward and Back buttons allow you to move step-by-step through construction, backing up whenever necessary.

Unlike the printed instructions of standard electronics kits, the on-screen connections are easy to follow. If you prefer the old-fashioned method, you have the option of printing the text instructions.

After the wiring is done and you've had a chance to try out your project, you're rewarded with a brief, humorous QuickTime movie and an explanation of how the circuit works. You can complete projects in any order, and when they're all done you can print an award certificate.

The Last Word Although Fun With Electronics can't compete with standard kits on price or number of projects, its lively approach may be just what's needed to encourage your child to learn something new. After he or she is hooked, you can follow up with one of the larger traditional kits from your local electronics shop.—STEVE SCHWARTZ

RATING: ★★★/6.9 **PROS:** Entertaining and informative; easy-to-follow instructions; good use of multimedia. **CONS:** Expensive when compared with standard kits; small number of projects. **COMPANY:** Philips Media (310/444-6500). **LIST PRICE:** $44.99.

What Do You Do With A $100 Digital Video Camera?

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QuickCam™ includes everything you need to make movies and take pictures with your Mac. Plug in one cable, install the software and you're ready to roll. Add still photos to documents, newsletters, databases. Record QuickTime® training movies, video conference, create animated cartoons – all for around $100. Works with all QuickTime compatible software and on all QuickTime compatible Macs, including PowerBooks®. It's easy, fun, and your satisfaction is guaranteed. Get your QuickCam today where fine computer products are sold.

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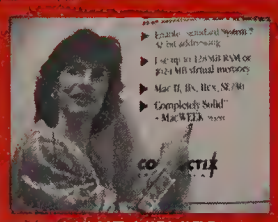
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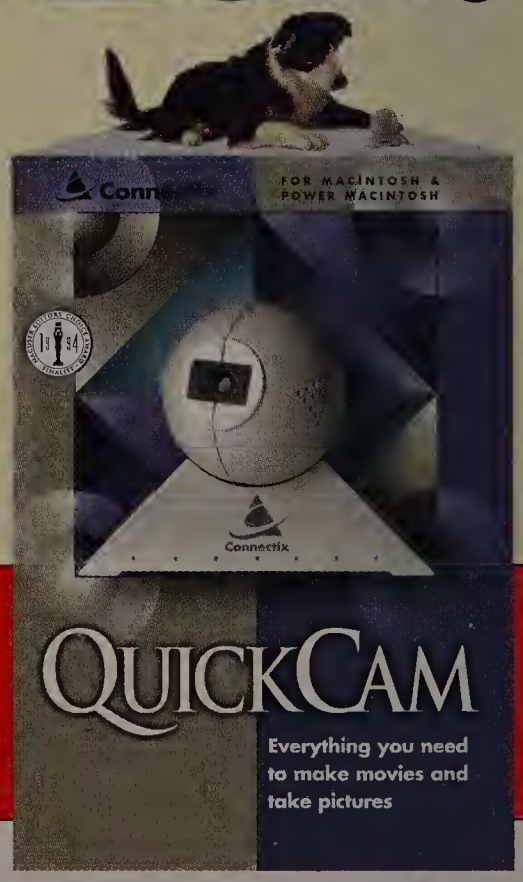
VIDEO CONFERENCE

TAKE PICTURES

BE CREATIVE



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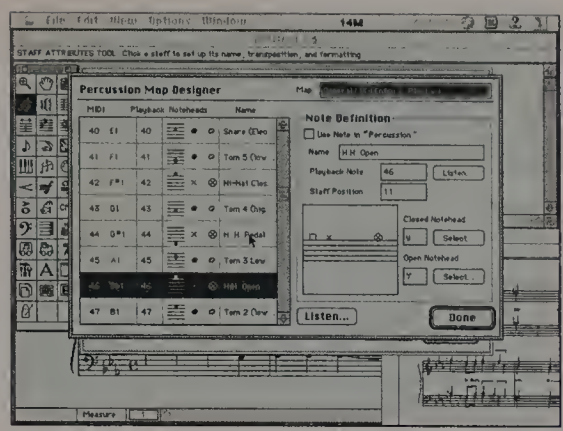
Finale 3.5.1

MUSIC-NOTATION SOFTWARE GOES NATIVE, PICKS UP THE TEMPO

FINALE HAS BEEN THE ONE TO beat in music-notation software since the days when it was the only entry in the race. Version 3.5.1 should help Coda Music Technology stay ahead of the pack, which now includes such fine products as Opcode's Overture and TAP's Nightingale. These environments help you with all phases of music composition, from note entry (usually from a MIDI instrument) to editing and printing camera-ready scores and parts. Finale's huge assortment of tools and techniques takes some time to learn, but anyone who writes music—amateur or professional—can benefit from a notation program this comprehensive.

Finale 3.5.1's most notable improvement over earlier versions is that it's Power Mac native. Seasoned Finale users unanimously agree the new version's performance on a Power Mac is breathtaking; operations that used to invoke Finale's spinning eighth-note cursor are now instantaneous.

Other long-awaited additions include drum mapping, in which you assign staff positions and note heads to MIDI drum-kit sounds (see "What's Playing on Channel 10?"); a Special Tools palette that stays open throughout the entry and editing process (previous versions required some toggling); and innovative use of color to separate score layers and define musical elements.



What's Playing on Channel 10? You control Finale's customizable drum mapping using the Percussion Map Designer.

Finale now works with OMS, Opcode's public-domain MIDI manager. OMS doubles the number of available MIDI channels to 64, a boon to users of Opcode sequencing programs and those with multiple synthesizers. Finale can also use System 7.5's QuickTime Musical Instruments extension for realistic synthesized sound.

Page-layout and printing improvements abound. For example, you have greater control over augmentation-dot positions, the weight and position of bar lines, and alternative page-layout systems for printed parts and scores. However, I encountered minor glitches when using some of the tools, and chord symbols tend to disappear from cut-and-pasted blocks of music. Coda is aware of the problems and promises to make a patch available in the near future.

The Last Word Finale has always led the pack in features, though other programs could claim a performance advantage. No more: the new Power Mac version narrows the performance gap significantly. Its many new features don't make this program any easier to learn, however; whether you're a music hobbyist or a professional, you'll need to be dedicated to learn and master Finale. Fortunately, the manuals are among the best you'll find for any Mac program, and Finale's superlative performance, interface, and tutorials help make the learning process painless.—RICHARD FENNO

RATING: ★★★★/8.1 **PROS:** Unbeatable performance; greater control over page layout; new drum-mapping feature. **CONS:** Difficult to learn; minor problems with some tools. **COMPANY:** Coda Music Technology (612/937-9611, *codatech @aol.com*). **LIST PRICE:** $545.

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THE VIDEO CONNECTION

VIDEOCONFERENCING—DESKTOP FACT OR SCIENCE FICTION?

The words *desktop videoconferencing* conjure up some tantalizing images. The best metaphor is the 1950s notion of the videophone. Had you been hovering around a World's Fair or other harbinger of technological wonders at that time, you might have seen films depicting the mom of the future—nattily dressed in high heels and a cocktail dress—picking out drapes for the living room, inspecting the greengrocer's fresh vegetables, and approving Junior's haircut, all from the convenience of her high-tech kitchen.

Alas, few of these images have any bearing on the technology's current state. If you're looking for a system that will save workers in other states from having to hop planes to the main office, don't look to desktop videoconferencing (DVC). Today's tools are point-to-point systems, designed to communicate between two stations at a time. The audio quality, for the most part, is the equal of a standard phone call. And you might tentatively judge drapes, vegetables, and haircuts with one of these systems (provided the items are held virtually motionless as you scrutinize them).

The best DVC system we tested displays compressed quarter-screen QuickTime movies, hardly the equal of a VHS home video, let alone a satisfactory substitute for a real human being. And if you're hoping for a system that permits half a dozen managers to hold spontaneous conferences, prepare yourself for a few disappointments. Conferences between three people over phone lines require intricate planning and are anything but spontaneous, while interoffice LAN conferences can slow other network activities to a crawl.

Indeed, judging by Macworld Lab's experiences, DVC isn't quite so dreamy as yesterday's futurists had hoped. No one foresaw Mom struggling with elaborate installation and connection procedures, peering at coarse little video images, or compromising quality to get two systems from different vendors to communicate with each other. Today's videophoning homemaker would have to have a working understanding of such alphanumeric jumbles as ISDN, NT-1, SPID, H.320, and CIF (don't worry, I'll explain these in due time). This is remarkably unfriendly technology, certain to make the most seasoned Mac professional utter words unsuitable for broadcast.

But if you're willing to struggle with the double whammy of only fair performance and a complicated setup, DVC has its attractions. You can see who you are talking to, demonstrate products, trade online notes, and control applications remotely. Rather than trying to explain visual concepts over the phone, you can actually show—and even annotate—them.

With this laundry list of limitations and benefits in mind, Macworld Lab tested seven DVC software and hardware solutions, which varied in price from the very affordable (free, in one case) to the predictably expensive (several thousand dollars; see the table, "Future Shock"). We subjectively evaluated the performance of each product on a Power Mac 7100/80 with 24MB of RAM and a 16-bit

MW LAB

BY DEKE McCLELLAND

display, placing equal emphasis on video and audio. We looked at frame rate and size, and observed how images fared when objects were stationary and when they were in motion. We evaluated audio quality based on our expectations of a standard phone connection. In other words, could we speak normally—even talk over each other—and be fully understood? Finally, we measured the synchronization of audio and video, with the assumption that a local video conversation shouldn't look like a scene out of a bad stop-action Godzilla movie.

We found that DVC is off to a rough but promising start, which unfortunately is the same thing we discovered the last time we checked out these products (see "Desktop Videoconferencing," November 1994). As Mom would say, DVC has lots of potential, but it looks like it'll be a late bloomer.

It's the Connection that Counts

A typical DVC system comprises a video camera and microphone; hardware to digitize and in some cases compress video and audio; one or more pieces of software; and some mechanism for connecting to other systems. This last element is by far the most important part of any DVC system, since it determines how fast data transfers from one machine to another. Quite simply, video and audio

WANT BETTER VIDEO? PAY MORE MONEY

If you still hanker for videoconferencing that looks more like *Seinfeld* than like 1950s science fiction, be prepared to pull out your checkbook. You can get excellent video quality and transmission rates on your Macintosh, but not on a point-to-point system—only as a client linked to a heavy-duty server with a heavy-duty price tag.

By virtue of its QuickTime Conferencing product and networking cards, Apple is part of a group called the INC (Isochronous Networking Communication) Alliance, which includes router manufacturers like Cisco Systems and Bay Networks, codec and video-subsystem manufacturers like Sat Sagem, and hub and switch manufacturers like Luxcom and Siemens, among others. With an isochronous Ethernet card and QuickTime Conferencing installed on the Macintosh, and using unshielded twisted-pair wiring (most likely already installed) to reach the server (running operating systems from Apple, Microsoft, Novell, IBM, or Sun), you can set up videoconferencing across the network with estimated frame rates of up to 30 fps (the same as television).

The INC Alliance expects widespread availability of its members' products this year; some, like Luxcom's Isomax multimedia switch, started shipping last December. But again, expect a hefty price tag for clear video quality: the Luxcom switch alone costs $17,000. You can expect to spend upward of $35,000 for a complete system, depending on the number of users.

Office Workers Only Client-server videoconferencing systems such as those from Avistar deliver great resolution and performance, but you should expect to pay tens of thousands of dollars.

As an alternative, check out some client/server systems. Continuum Research's (510/549-3268) Line of Site products link a Macintosh server with client software for both Mac and Windows, running on an Ethernet network at up to 30 fps. The cost? Continuum estimates that a 24-user configuration will set you back $36,000, or $1500 per user. That's $14,000 for the switch, $2500 for the server software, $995 for the camera and controller, and $750 to $1000 for the client software.

If your corporate system is based on Unix, check out Avistar Systems' (415/617-1350) Avistar videoconferencing and collaboration system, which runs on a Sun Microsystems server and includes a whiteboard, conferencing, and a user directory. It incorporates Macintoshes in a client/server system along with Unix and PC desktops, all connected to a Sun server. It'll deliver crisp, clear video, also up to 30 fps, for up to four people sitting at their desks in one office; Avistar is still developing wide-area-network systems.

Avistar estimates that a 20-user configuration will set you back $60,000, or about $3000 per user. That's more expensive than almost all the systems we tested. Here's how it breaks down. For the server, video switch, 4-way conferencing software, and cabling, you can expect to spend $21,600. The basic software for the Macintosh and the other clients is $695; adding in the hardware, including a camera, a microphone, speakers, and a network interface card, the total per desktop comes to $1899. The payoff, though, is quality. Macworld Lab's director took one look at the Avistar system and said, "This is what I expect desktop videoconferencing to look like."—HOWARD BALDWIN

data each require generous, uninterrupted bandwidth; without such bandwidth, you get jerky video and garbled audio.

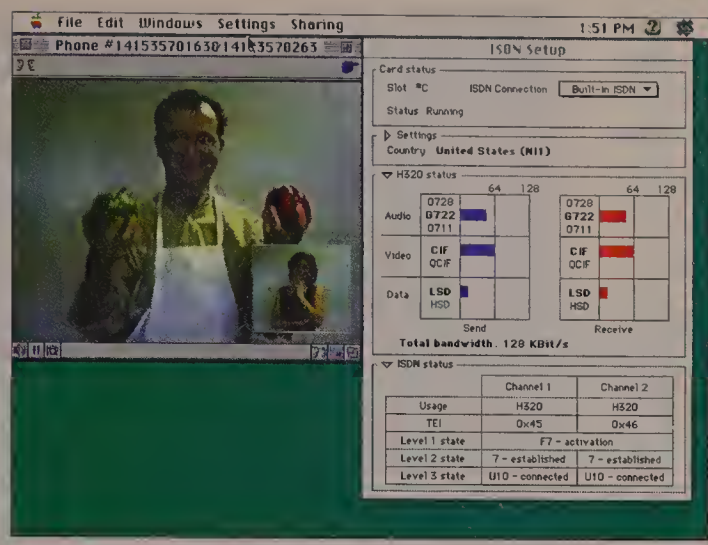
There are four network choices for desktop videoconferencing.

• **LAN** Ethernet is the original broadbandwidth medium, permitting transmission of 10 Mbps (megabits per second). But unless you and your associates plan on talking to each other late in the evening after the rest of the office has gone home, your two-way video and audio data will compete with E-mail, printing, downloading, uploading, file sharing, and all the other stuff that's already threatening to overwhelm the network. As a result, video frames may arrive in the wrong order, snippets of audio may disappear, and your message may get generally bungled. We tested two LAN systems, CU-SeeMe from White Pine and a beta version of the VideoPhone from Connectix. (A low-cost version of Apple's QuickTime Conferencing Kit also runs over a LAN, though we tested the system on ISDN.)

• **Internet** If you're connected directly to the Internet, your remote DVC adventures are likely even less satisfactory than an interoffice LAN connection. (We tested White Pine's CU-See-Me this way, as well.) In other words, don't expect smooth frame rates, and prepare to say "Pardon me?" a lot. The good news is that you can bypass commercial long-distance carriers. For absolutely no money per minute, you can place a person-to-person video call to a buddy in London, Hong Kong, or Buenos Aires. It's the most affordable friends-and-family program on the planet.

• **POTS** You can make a DVC connection over regular phone lines, known as POTS, for Plain Old Telephone Service. A POTS connection is analog, but common wisdom holds that you're lucky to get 28.8 Kbps (kilobits per second). That's hundreds of times slower than Ethernet, but your audio and video don't have to compete with other data, so you'll probably get better results than over a network or the Internet. We tested only one DVC system over POTS—the ShareVision Mac3000 from Creative Labs—which delivered clear sound, low frame rates, and poor synchronization.

• **ISDN** The service that promises to blot out POTS is ISDN (Integrated Services Digital Network), a system of digital phone lines supposedly available in nearly every state. ISDN offers fast (up to 128-Kbps), uninterrupted connections, ideal for DVC. But like any emerging technology, ISDN has its disadvantages. Relatively few companies are hooked up to ISDN, installation is expensive and in some regions unavailable, and initial setup can be messy and a little mystifying. After you specify what kind of system you want—National ISDN-1 (NI-1) is fast becoming the de facto standard—you typically get a BRI (Basic Rate Interface) line with two bearer (B) channels and one delta (D) channel. When configured correctly, one B channel carries data and the other carries voice, while the D channel carries control signals. You also get a SPID (Service Provider Identification) number—a fancy name for a phone number—for each B channel. SPID numbers are 11 digits long—that's the area code, the 7-digit phone number, and an extra number hanging off the end. But as we discovered, you can theoretically enter this last number in several different ways. It took us a few days to figure out that the only way to make our particular DVC products work with our ISDN system was to enter a 13-digit number; that is, adding 0 as digit 12 and then repeating the 11th digit. With the phone companies still struggling to understand ISDN, don't be surprised if you encounter a few snarls, too. We tested four systems over ISDN—Apple's QuickTime Conferencing Kit, Sat Sagem's Meet-Me, Northern Telecom's Visit Video 2.0, and RSI Systems' Eris. (Northern Telecom's upgrade to version 2.1 was in beta when we tested, so we only looked at 2.0's features.)



Picture in Place When you're checking out fruits and vegetables, you want to see what you're getting. That's why Apple's QuickTime Conferencing Kit was one of our favorites (once we got past its complicated ISDN setup). It was one of the three products with the largest frame size.

More Lettuce Necessary Sat Sagem's Meet-Me is based on Apple's product; Meet-Me is more expensive because Sat Sagem includes the NT-1 box used for the ISDN connection, but Apple doesn't. That's an additional $1000—no small potatoes.

The four ISDN systems include dedicated codec (compression/decompression) boards to reduce data rate and increase frame speed. The POTS and LAN systems rely on software codecs, meaning that the Mac's logic board has to handle all the audio and video calculations in addition to its other duties. As a result, these products perform unevenly, with audio sometimes arriving a full second earlier than video.

Talking the Same Talk

At the time of our last DVC roundup, you could forget about getting two systems from different vendors to communicate with each other. The problem was differing video and audio codecs. One system couldn't decompress what the other system had compressed. It's as if Mom couldn't call the grocer because she and the grocer had different brands of phones.

This remains a problem for network and POTS systems, which use different kinds of software compression. However, all but one of the ISDN systems we tested—the Visit Video 2.0—have embraced the International Telecommunications Union's H.320 standard, a set of video- and audio-compression standards. In the-

ory, any two systems that support H.320 can talk to each other, even if one is running on the Mac and the other on Windows. Though we did not test our systems on different platforms, we were able to make our three H.320-compatible systems—the QuickTime Conferencing Kit, the Meet-Me, and the Eris—share video and audio data over ISDN lines. In fact, once we got the initial ISDN wrinkle ironed out, the systems communicated without a hitch.

But keep in mind that H.320 provides only video and audio exchange between dissimilar systems, not application sharing. If you want to show a digital sketch to a colleague or take turns using a single application, you both have to be using the same DVC product. A standard for more comprehensive cross-product collaboration does exist—the recently christened T.120—but the ISDN systems have yet to support it (though they all plan to).

CESAR RUBIO

Get the Blues RSI Systems' self-contained Eris box—taking up no more space than a toaster—attaches to the SCSI connector at the back of your Macintosh. The round bulge at the front is the speaker. We loved everything about it except the $3995 price tag.

Video, Audio, and Beyond

The primary function of any self-respecting DVC software is to transmit and receive audio and video data. When connected, you see both yourself and the caller on screen at the same time. From our tests, you can expect a self view to hum along at 15 to 30 frames per second (the latter is equivalent to television), but your caller view will likely vary—running at 5 to 15 fps over ISDN and less than 10 fps over a LAN, making for some pretty jerky video. Most of the products display video in 16-bit color; only two—the VideoPhone and CU-SeeMe—are limited to 4-bit gray scale.

All DVC systems let you adjust brightness and contrast, and the color systems let you change tint and hue. The cameras that come with the QuickTime Conferencing Kit and Meet-Me let you focus using the lens ring, while the ShareVision Mac3000's and Visit Video's cameras let you zoom in and pan, great for reducing extraneous background junk.

On the sound side, you can adjust the audio level to make your voice as loud as possible without becoming distorted. Three of the ISDN systems offer traditional handsets—optional in the case of the QuickTime Conferencing Kit and Meet-Me, obligatory for the Visit Video—that entirely eliminate echoes, in exchange for cramped necks and sweaty ears. The ShareVision Mac3000 offers an earpiece with microphone for hands-free communication without echoes.

In addition to the essential audio and video capabilities, all systems except for CU-SeeMe and the Eris provide so-called whiteboards—shared screens in which you can draw pictures, type notes, paste images, and otherwise communicate by nonverbal means. One system, the ShareVision Mac3000, also provides application sharing, so that you and your caller can collaborate on a document inside any program available to both machines.

You can also take snapshots of yourself or your caller using any DVC system. Some systems let you record your con-

Future Shock

Company	Product	Star Rating [A]	List Price per Desktop	Phone	What You Get	Requirements
Apple Computer	QuickTime Conferencing Kit	★★★★/7.1	$2000 [B]	408/996-1010	video camera, handset, codec and ISDN daughterboard, software [B]	AV Mac, 16MB of RAM, mike, NT-1 box
Creative Labs	ShareVision Mac3000	★★★/6.5	$1149 [D]	408/428-6600	video camera, audio board, earpiece/mike, external modem, software	AV Mac, 8MB of RAM
Northern Telecom	Visit Video 2.0	★★★/5.2	$2999	214/684-1000	video camera, digital phone, codec and digitizer board, Universal Terminal Adapter, NT-1 box, software	Mac II, 8MB of RAM
RSI Systems	Editors' Choice Eris	★★★★/7.5	$3995	612/896-3020	SCSI device, software	68040 Mac, 8MB of RAM, mike, video camera, NT-1 box
Sat Sagem	Meet-Me	★★★/6.8	$2995	408/446-8690	video camera with mike, handset, codec and ISDN daughterboard, NT-1 box, software	AV Mac, 16MB of RAM
White Pine	CU-SeeMe	★★★/5.8	freeware [E]	603/886-9050	software	Mac II, 3MB of RAM, Etherne or Internet access, mike, video-input board, camera

[A] Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) [B] LAN-only kit available without codec board or ISDN softwa and whiteboard due in early 1996.

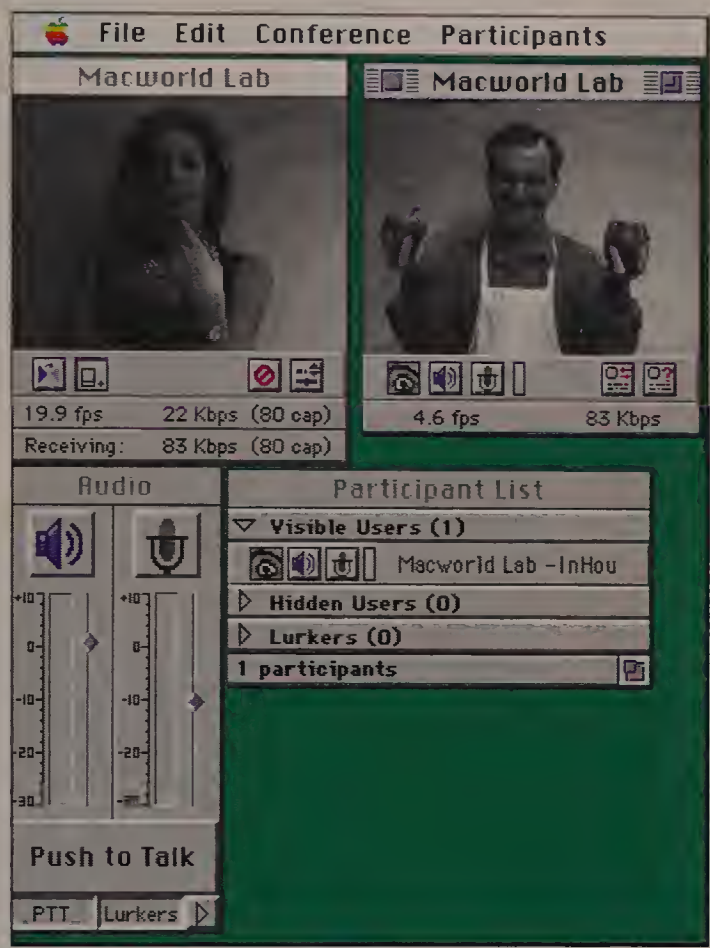
versations to disk as QuickTime movies. Unless you have lots of free gigabytes of hard disk space sitting around, however, you're better off recording your conversations to videotape via your computer's AV board—in the case of the ShareVision 3000, QuickTime Conferencing Kit, or Meet-Me—or just pointing a camcorder at the screen. The Eris system even lets you hook up a VCR for direct recording.

LAN-Based Videoconferencing

Our two LAN systems—CU-SeeMe and the VideoPhone—are both affordable systems that combine straightforward software with meager performance. Developed by a group at Cornell University, CU-SeeMe is freeware that lets you communicate over a network or the Internet. You have to provide all the hardware, including a video-input board, camera, and microphone. In return, CU-SeeMe delivers 4-bit gray-scale video with get-by audio. No whiteboard, no pan or zoom, no frills. But for free, it's not a bad deal.

Not yet shipping when we ran our tests, the $249 VideoPhone offers both software and hardware. Connectix (415/571-1500) has licensed Apple's Media Conference application and combined it with its own QuickCam audio and video digitizer. But while the QuickCam couldn't be easier to use (you just plug it into the Mac's serial port), it simply doesn't hack it for DVC. The video (also 4-bit gray scale) was easily the crudest we looked at, and the QuickCam mike is so bad that Connectix recommends you use the Mac's instead.

We tested CU-SeeMe with a color video camera and a PlainTalk microphone. We were impressed with CU-SeeMe's delivery of 4 to 8 fps over *Macworld*'s busy LAN. Although the audio was half duplex—meaning that only one person could be heard at a time, as with a walkie-talkie—the echo reduction permitted all parties to be understood. The lip sync was a half-second off but generally acceptable. By contrast, the VideoPhone's frame rate at times barely exceeded 2 fps. Audio and video were badly synced, and the echo-reduction system was altogether inadequate.



No Green Required You can download CU-SeeMe for free from the Internet, and that makes it useful for everyone from supermarkets to roadside stands. For documentation and support, you'll need White Pine's commercial version.

CU-SeeMe is undoubtedly a poor man's DVC solution. Since it lacks full documentation or structured technical support, you probably don't want to invest a lot of faith and energy in it, but it's a great way to get a taste of DVC. If you're wary of freeware, a commercial version called the CU-SeeMe Enhanced should be shipping from White Pine by the time you read this. Priced at $99, it will include color video, full duplex sound, and a whiteboard, plus documentation and technical support.

We can't recommend the VideoPhone as a professional

Pros	Cons	Network	Video	Maximum Frame Size (in pixels)	Sound	Application Sharing	File Transfer
Very good value; straightforward software also works with LAN.	Complex ISDN setup; no digitizer.	LAN, ISDN	color	352 × 288	handset or your own mike and speakers	no	yes[C]
Easy to install; works with common telephone lines; good sound quality.	Small maximum frame size; poor synchronization; no digitizer or codec board.	POTS	color	160 × 112	earpiece/mike or your own mike and speakers	yes	yes
Complete hardware package; good call management.	Lacks support for H.320; small frame size; have to use handset.	ISDN	color	176 × 144	handset or phone speaker	no	yes
Easy-to-install dedicated box; good sound and video; only ISDN system that works with PowerBooks.	Expensive; supply your own camera and NT-1.	ISDN	color	352 × 288	your own mike and speakers	no	yes
Straightforward software; good video and audio.	More expensive than Apple system; no digitizer.	ISDN	color	352 × 288	handset or your own mike and speakers	no	yes
Currently free; great for avoiding long-distance charges.	Internet is poor vehicle for video; gray-scale video; supply your own hardware.	LAN, Internet	4-bit gray scale[E]	320 × 240	your own mike and speakers	no	no

[B] For $250 (estimated street price). [C] With Sat Sagem's EasyTransfer Lite. [D] Also available as ShareVision Mac300, without camera, for $749. [E] Enhanced commercial version (list price $99) with color video

DVC solution, but if you already have your own hardware and you're looking for solid, flexible DVC software designed for use with any 68040 or better Mac, you can purchase the software independently for an estimated street price of $60. (It is identical to Apple's Media Conference software, but Connectix is currently the only vendor that sells it without hardware.) The software offers a shared whiteboard that always appears in color, despite the gray-scale video. And if you replace the QuickCam with a different video camera and digitizer, the software supports color video and quarter-screen frame sizes. In fact, the VideoPhone package exceeds the CU-SeeMe Enhanced one, permitting you to record movies to disk, offering standard QuickTime compression formats, and accepting multipoint conferences.

Talking over Phone Lines

The ShareVision Mac3000 is the only DVC system we looked at that's designed especially for communicating over POTS lines. It includes an audio-compression board, a 28.8-Kbps modem, a fixed-focus video camera, and an earpiece with microphone. Sadly, it does not include a video-digitizer or -compression board, so you have to own an AV Mac in order to use the product. (If you already own a video camera, you can purchase the ShareVision Mac300 system without a camera for $749.)

The audio from the ShareVision was as clear as a common phone call. We were especially pleased with the earpiece/mike, which allowed us to hold private conversations and still keep both hands free. The video was less impressive, though it was adequate given the inherent limitations of POTS. Though it was full color, its frame size was small—160 by 112 pixels—and we were never able to achieve a frame rate of more than 5 fps (⅙ the rate of television transmission). We couldn't connect at a data rate higher than 19.2 Kbps when calling outside the building, which may have been partly responsible for the low rate. Also frustrating: the video lagged a full syllable behind the audio. Still, the picture was crisp and defined, allowing us to trade visual information and approximate face-to-face conversation.

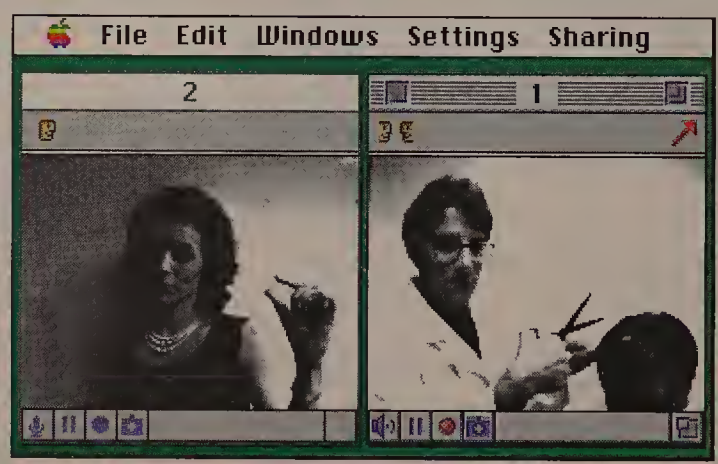
Where the ShareVision system excels is in the auxiliary feature department. In addition to a whiteboard, it offers full application sharing. You can also transfer files back and forth over POTS; although the video pauses during the upload, you can still talk to each other. You can also zoom and pan either your view of yourself or your view of the caller. But strangely, you have to pan inside a Preferences dialog box; we'd prefer dynamic controls.

If you aren't ready to invest in ISDN, or it isn't yet available in your area, the ShareVision Mac3000 makes the most of POTS. But if you're serious about DVC and you want the best video and audio money can buy, keep reading.

Making the ISDN Investment

Where hardware is concerned, ISDN developers have yet to agree on a common approach to DVC. Only the $2000 QuickTime Conferencing Kit and $2995 Meet-Me systems offer similar hardware, and they are almost identical. Each provides a Planet ISDN codec and an ISDN board, which connects via a ribbon cable to an AV Mac's digital audio-video slot. (Like the ShareVision 3000, these two systems lack digitizers, so an AV Mac or third-party board is required.) You also get a manual-focus video camera that permits close-up shots, and a handset that plugs directly into the Planet ISDN board. The only hardware difference: the Meet-Me kindly includes an NT-1 box, while Apple requires you to buy one from your ISDN provider.

Small Canvas Although we got good sound quality with Creative Labs' ShareVision Mac3000, it delivered one of the smallest frame sizes of all the products (160 by 112 pixels). That's only good when you're painting miniatures.

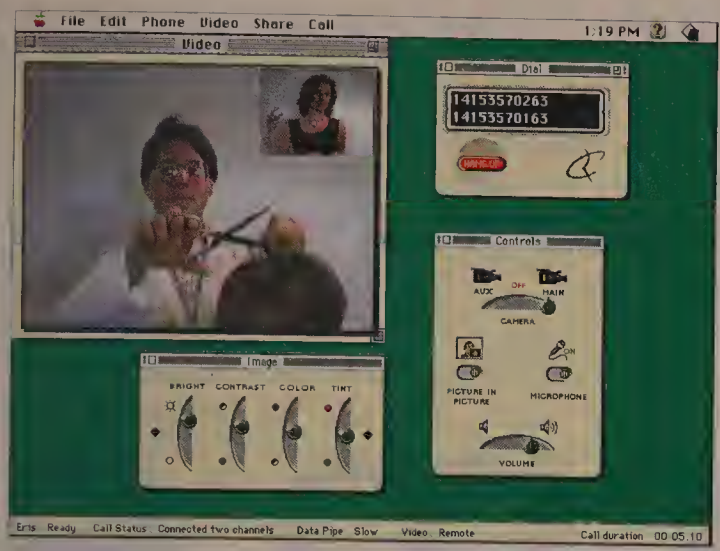


Clipped Sound It's hard to judge a haircut with VideoPhone. Connectix has licensed Apple's QuickTime Conferencing Kit for its product, which delivered poor sound and crude video in the beta version we looked at.

The $2999 Visit Video setup from Northern Telecom, meanwhile, is actually two separate systems, one for voice and one for video. The two ISDN channels split off, one into the hardware codec—where the video is processed—and the other into a digital phone. Because the Mac never touches the audio, you can't use your own mike and speakers; you have to use the telephone handset or the typically shrill phone speaker.

The most expensive system of the bunch, the $3995 Eris from RSI Systems, includes the fewest parts. The Eris is a single SCSI device with digitizer, codec, and ISDN hardware all housed in one blue box. There's no NuBus or PCI card, so it even works with a PowerBook, a feat unmatched by any DVC system except the VideoPhone. And aside from the unavoidable ISDN hassles, the Eris is a dream to install. Plug it in and it's ready to go. Sadly, $3995 doesn't include a video camera or an NT-1 box, though RSI sells these items separately for around $500 more, depending on the kind of camera you choose.

As you might imagine, such different approaches yield different results. We were pleased with the quality of the picture generated by the QuickTime Conferencing Kit and Meet-Me, though the frame rates hovered around 5 to 8 fps. The sound was also good, over both the handset and the standard powered speakers, and synchronization fared well. When we reduced



A Cut Above Although it's the most expensive option, we loved RSI Systems' Eris. Its installation was so easy that even our barber could set it up, and it offered excellent sound and video. It's also the only product that works with PowerBooks.

Not a Pretty Picture Although Northern Telecom has been doing videoconferencing on the Macintosh longer than anyone else in the roundup, we were disappointed in the Visit Video's small frame size (just 176 by 144 pixels) and the fact that we had to use our handset. That's no fun when the phone is under a drop cloth.

frame size, naturally frame rates improved to between 12 and 15 fps—about the same as the Visit Video.

But the Eris was the clear favorite. Our testers unanimously awarded it 4 out of 5 points for video (in contrast to the other systems, with which our picky testers invariably found fault). The Eris provided a consistent 10 to 12 fps, even at the larger frame size, and the compression was generally unobtrusive. The audio and synchronization were every bit the equal of other systems'.

The Eris also won the extra-features competition. Though it lacks the whiteboard provided by its three ISDN-based competitors, it alone provides RCA audio and NTSC output jacks. These allowed us to cable a large-screen NTSC monitor to the device. Though you don't get any additional detail on a big TV, you can easily see the caller from several feet away, ideal for adding a remote person to an in-house conference. You can also record both sides of a conference to videotape—complete with letterboxing—while viewing the conversation on your RGB screen.

Apple's extras finish a close second. Like the VideoPhone software, the QuickTime Conferencing Kit offers a shared whiteboard with translucent ink for highlighting; it even lets you change the cursor to make it easier to see. If you prefer to connect over a LAN, Apple sells software and a video camera without the ISDN stuff for an estimated $250. Apple bundles the software gratis with Power Mac models 7500 and 8500. The Meet-Me's software is slightly different from Apple's, but it is functionally equivalent. The most notable distinction is that, when you're connecting, the Meet-Me's self view always appears as a picture-inside-a-picture, obscuring a portion of the caller view. With the QuickTime Conferencing Kit, you can look at the self view in a separate window. In fact, the Meet-Me's one notable disadvantage compared with the QuickTime Conferencing Kit is the price. For nearly $1000 more, you get the NT-1 box (though prices are likely to fall this year).

The Visit Video system has its share of strengths, including extensive phone-directory and voice-mail capabilities. And it's one of the few systems that bundles absolutely everything you need, including a video digitizer. Unfortunately, the Visit Video is not H.320 compatible, nor are there any plans to make it so (though this spring Northern Telecom is planning to release an H.320 system with application sharing under a different name for PCs). This makes the system an island of technology with no chance of joining the greater DVC community. As long as you're willing to suffer with the headaches of setting up ISDN, you're better off with a system that exploits all of ISDN's inherent advantages, particularly cross-product compatibility.

The Last Word

As any conscientious twenty-first–century mom will tell you, you have to lower your expectations before investing in DVC. If you anticipate television-quality video, smooth movement, crystal-clear sound, and exact synchronization, your bubble will surely burst (unless you have the budget; see the sidebar, "Want Better Video? Pay More Money"). With slow frame rates, small frame sizes, and a large helping of chunky video compression, little gestures like lip movements defy perception, while large motions appear coarse and blocky. The whole experience is more like watching a broadcast from the moon than speaking to a fellow human being on the home planet.

But if you go into the DVC market with your expectations in check and your pocketbook full, you may arrive at a satisfactory solution. RSI Systems' Eris wins our vote for Editors' Choice, providing easy installation as well as acceptable video and telephone-quality sound. But Apple's QuickTime Conferencing Kit is none too shabby either, clearly demonstrating the advantages of ISDN for just half the price of Eris.

For most of us, the videophone is still a thing of the future. But unlike flying cars and self-cleaning homes, it's at least in the early stages today, and it will undoubtedly work well within five years and become affordable within ten. Some day, who knows? Maybe even my mom will be using DVC. **m**

In addition to exploring multimedia trends for *Macworld*, DEKE McCLELLAND has written *Mac Multimedia* and *CD-ROMs for Dummies* (IDG Books Worldwide, 1995).

DESKTOP VIDEOCONFERENCING

MW EDITORS' CHOICE

Where quality desktop videoconferencing is concerned, price takes a back seat to features and performance.

★★★★/7.5 **Eris** Though it costs about $1000 more than its nearest-priced competitor, the Eris provides high-quality video and full H.320 compatibility. It is also compatible with any 68040 computer system, including laptops, and provides NTSC output. You supply the camera and ISDN line, the Eris furnishes the rest. **Company:** RSI Systems. **List price:** $3995 per connection.

THE RIGHT TOOLS AND THE RIGHT STRATEGIES FOR WORKING AND LIVING UNDER THE SAME ROOF

Home Office Blueprint

by James A. Martin

A few years ago, I set up an office in my home. My desk consisted of a thick piece of glass placed atop two filing cabinets. I dragged a lawn chair inside and used it as my desk chair. There was no telephone outlet in the room, so I brought the cordless phone in from the kitchen. And I jury-rigged an IBM PC–compatible ink-jet printer to work with my Macintosh.

In retrospect, I wonder why I didn't just lay my body on a bed of nails every night to complete the scenario. That room was a veritable chamber of home-office horrors, a testament to total and complete inefficiency.

Over time I learned my lessons, though, and now I've got this home-office thing pretty well figured out. The key to creating a successful workplace in the home is to remember you're working out of an office that happens to be in your home, as opposed to a part of your home that happens to be an office. That means taking a professional, serious approach to establishing a comfortable and productive working environment, whether you plan to work in it all day every day, or just telecommute one or two days a week. Either way, there are many confusing issues to consider when setting up a home office: which Mac model, peripherals, and software you'll need, and how to sort through the morass of telephone services, to name a few.

What follows is a blueprint for planning a home office, from someone who learned the hard way. To begin, decide on the hardware and software you'll need; you'll find suggestions for both in this article. Shop for major pieces of furniture after you buy your hardware—that will save you from investing in an ergonomic desk, for instance, that can't accommodate the Mac you decide on. For ideas on how to design the perfect home office, see the diagram "Secrets of a Productive Home Office." The sidebar "Ten Smart Ways to Manage Your Money" offers advice on those most important of small-business concerns: taxes and finances. And I've listed the most useful books, online sites, and other references in the sidebar "How to Keep Up with Home-Office Trends."

Hardware: Decide What You Need

The urge to acquire the shiniest and brightest computer equipment for a home office can be strong. But do yourself a favor—suppress it.

The key to buying the right equipment is to think clearly about your short-term and long-term needs. For the short term, buy only what you know you'll need on a regular basis.

It's also important not to scrimp on the initial equipment you *do* buy, because

you want it to last as long as possible. For example, a Performa 6116CD, at $1699 including monitor and keyboard, might seem like a sensible way to buy a PowerPC Macintosh—and for some people with light computer requirements, it probably is. But that model has a 60MHz PowerPC processor, only one expansion slot, and a 72MB RAM ceiling, among other limitations. For $1699, you can also buy a Power Mac 7200/75, which offers a faster 75MHz PowerPC chip, provides three PCI expansion slots, and supports up to 256MB of RAM. True, the Power Mac costs you a bit more initially because it lacks a monitor and keyboard, but its expandability means that 18 months to two years from now you'll still have a viable computer. (For more on Performas versus Power Macs see *Consumer Advocate*, *Macworld*, April 1996.)

Also, consider all your possible needs before you buy a piece of equipment. For example, if there's a chance you may need a Windows PC later, in addition to your Mac, make sure the peripherals you buy now work with both platforms. Another option: when you need Windows, add a Pentium processor card to your Mac (for more on Pentium options, see "Apple's Pentium Macs," *News*, in this issue).

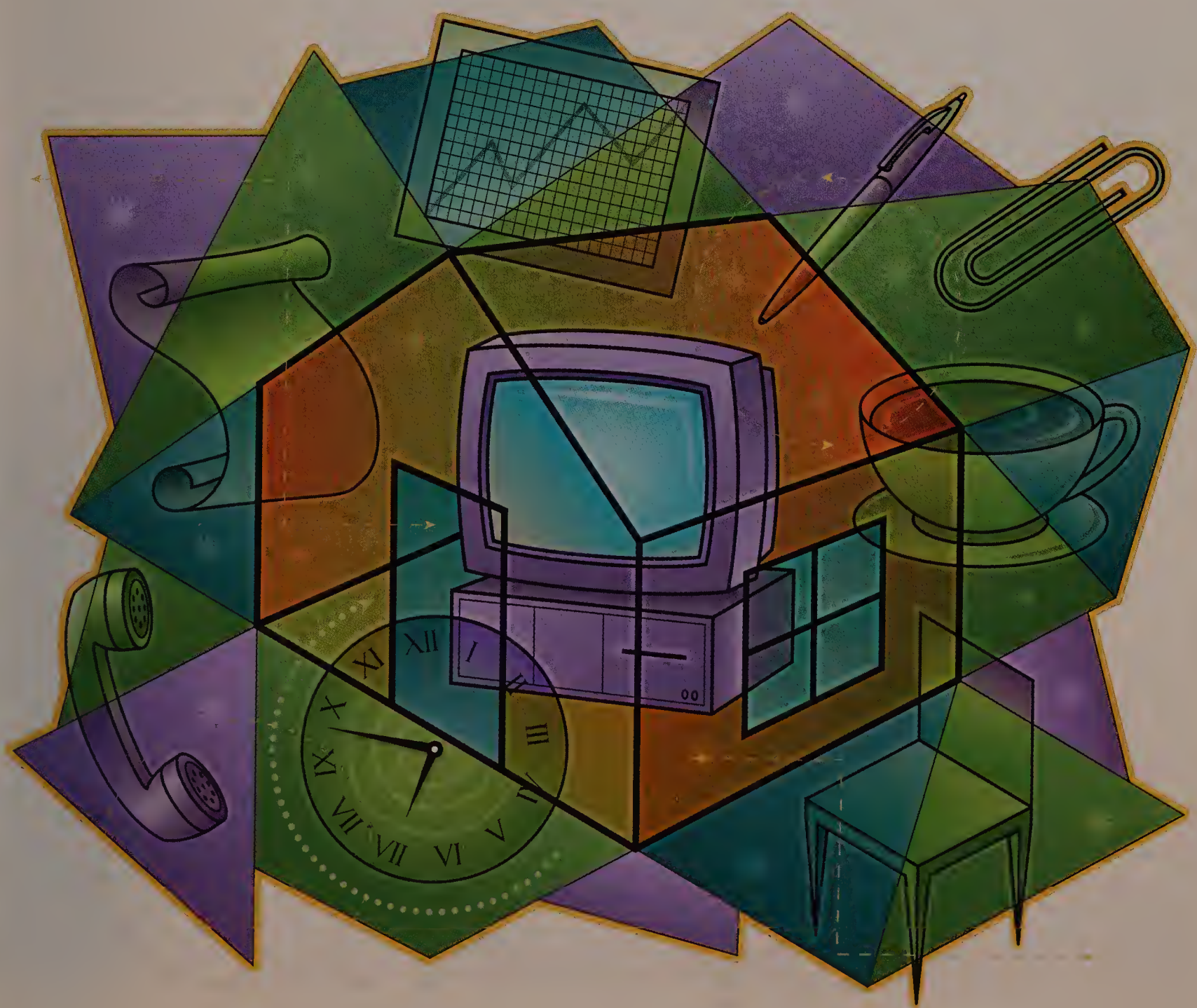
Similarly, if you may need a PowerBook in the future, buy peripherals that work with PowerBooks. Iomega's Zip drive (estimated street price $200; 801/778-1000), for instance, is fast enough to use as a storage device for your desktop Mac, and it's portable.

In general, the basic home office should include the following essentials:

A Fast, Expandable Mac Buy the speediest, best-equipped, most upgradable Mac you can possibly afford. A basic system for most business users should include a PowerPC processor, at least 16MB of RAM, a 500MB hard drive, a quad-speed CD-ROM drive, a 15-inch color monitor, and a keyboard with function keys. (For a discussion of ideal systems for different users, see "The Best Mac for the Job," February 1996.)

A Laser Printer In most cases, a PostScript Level 2, 600-dpi laser printer is the way to go. Its output is more professional than what you'd get from an inkjet or low-cost laser printer. If you're undecided, have light printing needs, and live close to a copying center or DTP shop, forgo the printer for now. Most stores will give you discounts if you pay for large blocks of printing and photocopying in advance.

There are multifunction devices from Xerox, Canon, Brother, and Hewlett-Packard that offer some combination of printing, scanning, faxing, and copying.



While third-party software can make a few of these devices work with a Mac, they were designed for Windows. They can save space, but you'll usually face some performance trade-offs—the HP OfficeJet, for instance, uses ink-jet technology, not laser. And if a multifunction device breaks down, you lose your scanner, fax machine, and copier at one go. For now, I'd skip the all-in-one devices until the technology improves and they support the Mac better.

A Fax Modem *and* a Fax Machine Don't try to get by with just a fax modem. Receiving faxes on your computer and then printing them is distracting and inefficient. Plus, there are times when you need to fax paper-based documents. And fax modems sometimes have trouble communicating with older fax machines; more than once, I've been thwarted trying to fax a document from my Mac, only to print it out and transmit it successfully from my fax machine.

When shopping for fax modems, look for 28.8-Kbps data capability. The 14.4-Kbps models are about $100 cheaper—$150 as opposed to $250—but you'll soon weary of their lackluster performance (see "Fast Fax Modems," December 1995).

Plain-paper fax machines are ideal, but they're expensive, often about $600. If you're trying to cut costs, buy a thermal fax machine for about $300 with an automatic paper cutter and memory to store incoming faxes when out of paper. Get thermal fax paper with the look and feel of plain paper—it's much preferable to the slimy texture of regular thermal fax paper.

Software: Begin Small and Build

As with hardware, first buy only what you'll regularly need, then add to your toolbox later if necessary.

For Starters After buying your equipment, you might not have much money left for software. No problem. Pick up an all-in-one program such as ClarisWorks 4.0 (list price $129; Claris, 408/987-7000). With word processing, spreadsheets, a database, graphics, a clip-art library, and low memory and storage requirements, ClarisWorks makes a solid starter kit (see "Works versus Works," November 1995).

Address Books and Calendars I've tried a number of so-called personal information managers (PIMs), but none has convinced me to give up my notebook Day-Timer organizer. The software version of Day-Timer has some nice features—it logs the amount of time you spend on a phone call, for instance. But for me, entering my appointments, to-do lists, and telephone notes on paper is simply faster, and I can take that important information with me anywhere.

I do recommend a contact manager, however, to keep track of your clients, colleagues, and others. If all you want is a lean, inexpensive, no-fuss program, consider InTouch (list price $49.95; Prairie Group, 515/225-3720). Unlike most contact managers, InTouch lets you enter data however you want. On the other hand, that unstructured format makes it difficult to perform mail merges—or to export your data, should you decide to switch PIMs later. If either of those capabilities is important to you, consider a program such as Now Contact (estimated street price $69.95; Now Software, 503/274-2800).

Time Tracking You should have a target hourly rate for all projects, even if you charge a flat fee; how else will you know if a project was worth your time? Software such as Timeslips (estimated street price $199.95; Timeslips, 214/248-9232) can help you record time and expenses for projects.

If you're just starting out, you can easily determine your hourly rate for a project using a spreadsheet program. Create a worksheet for each project. Record the time you spend on that project each day. Enter the time in minutes; you would record two hours, for example, as 120 minutes. At the bottom of the worksheet, create a formula that sums all the minutes you've entered. Then generate a formula that divides the project's total time by the fee. The spreadsheet will tell you how you're doing as you move

HOW TO KEEP UP WITH HOME-OFFICE TRENDS

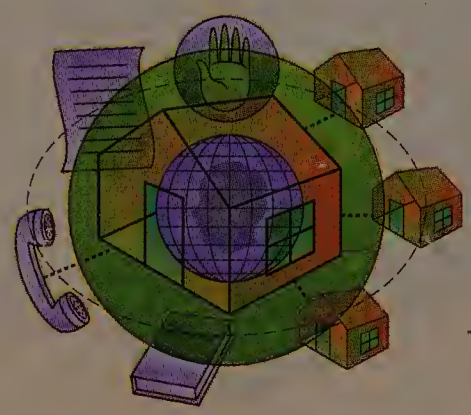
It's easy to feel out of the loop when you're working on your own. Take heart: there are plenty of resources for telecommuters and home-based entrepreneurs. The following is a selective guide to some of the best.

READ

- *Working from Home,* fourth edition (Tarcher/Putnam, 1994; $15.95). This tip-packed tome by Paul and Sarah Edwards covers all the bases, from deciding which job is right for you to advice on how to market your business.
- *Working Solo Sourcebook* (Portico Press, 1995; $24.95). Entrepreneurial expert Terri Lonier has compiled a helpful list of resources such as books, magazines, and associations to get you started.
- *Home Office Deductions: Tax Tips for Individuals* ($6.50; CCH, 800/835-5224) is an easy-to-read, 48-page publication explaining the tax benefits of a home office.

GO ONLINE

- CompuServe's (614/457-8600) Working from Home forum (keyword: *work*) has an extensive library of informative articles, and its message board and online chat sessions are great places to trade stories and make contacts.
- There are tons of Web sites for home-based workers. A good place to start your browsing is SoHo Central (*http://www.hoaa.com*). Maintained by the Home Office Association of America (212/980-4622), the site includes plenty of links to other sites, as well as news, articles, and other information.



JOIN ASSOCIATIONS

- The Home Office Association publishes a monthly newsletter, *Home Office Connections,* which updates members on current technologies, business opportunities, and more. The association also offers members group savings with United Parcel Service, Kinko's, and other companies. The $35 membership fee is tax deductible.

Secrets of a Productive Home Office

Are you settling into a new home office? If so, plan for efficiency and comfort, and spend what it takes—gradually, if finances so dictate—to realize your plan. See our suggestions for the good lighting, ergonomically designed workspace, and quiet, reflective atmosphere that will help you enjoy your work and succeed in your business. Items are listed from most to least important.

Make Your Desk Smart

Cramped hands and bent wrists can damage nerves in your forearms. Attach a movable tray (**A**) to your desk and adjust it so that elbows are slightly above wrists when you're typing and mousing.

Gripping a telephone handset between your neck and shoulder fatigues and eventually injures the neck and upper back. Protect yourself by wearing a headset (**B**).

Letting your legs dangle from your chair cuts off circulation. If your desk and chair are too tall, use a footrest (**C**) you can raise and lower as well as swivel.

Don't let screen glare tire your eyes. Make a glare-reduction hood (**D**) of black cardboard held together with tape—it doesn't look like much, but it's cheap and very effective.

More glare reduction: Use a focused halogen desk or wall lamp (**E**) instead of a normal lamp.

Turn your desk to align the monitor (**F**) perpendicular to the window, further limiting glare.

Neck and back muscles tire when you crane your neck or hang your head to see your monitor. Position the monitor with the top edge at eye level (**G**).

Make Your Office Work for You

Use surge-protected power strips (**H**) to catch spikes that could fry your equipment. Extension cords invite fire—install outlets where you need them.

If you can't risk losing files when a power outage hits, get an uninterruptible power supply (**I**) with unattended-shutdown capability.

Protect privacy, let in diffuse, nonglaring light with vertical blinds (**J**).

If printer and fax noise distract you, construct a noise-reduction box (**K**) from foam and cardboard (create some ventilation holes).

Use flat L-shaped plugs (**L**) that fit conveniently behind furniture.

through the project and give you a final hourly rate when you're finished.

Money Management Quicken 6.0 (estimated street price $39.99; Intuit, 415/322-0573) gives me all the features I need for my solo business. Anyone with more robust accounting, invoicing, and inventory needs should consider its big-sibling application, QuickBooks Pro 3.0 (estimated street price $118.99).

Untangling Telephone Services

Your local phone company, AT&T, MCI, Sprint, and the entire Internet-service-provider community have all conspired to confuse you with an array of services, prices, and promotions. So let's get some things straight, shall we?

Shop Carefully I've switched from MCI to Sprint to AT&T and back again, and my head is still swimming. As of this writing, AT&T's True Reach (call 800/222-0300 for information), which discounts calls by 10 to 25 percent, seems to be the best bet for me.

In general, long-distance business rates are higher than residence rates. You can save some money if you always spend more than $50 a month on long-distance calls, however. With Sprint's Business Sense plan, for instance, long-distance calls during the day cost up to 10 cents less per minute than the same calls made on the Sprint Sense residential plan. The catch: You must make at least $50 worth of phone calls each month in the Business Sense plan; if you don't, Sprint still charges $50.

Whatever you do, be sure to ask for accounting codes on your long-distance service. This feature lets you add a one- or two-digit code to each long-distance call you make. When the bill comes in, all the calls you coded with a 21, say, are grouped and subtotaled together. This eliminates several painful hours each month of trying to figure out which calls to bill to which clients.

The three major long-distance providers all offer this service, but their prices vary. Sprint charges $5 per month; MCI, $2.50; and AT&T throws it in for free. There are fine nuances, though. For instance, AT&T can code only out-of-state calls, whereas Sprint can code all calls outside your immediate calling area.

Install Two Business Lines Don't pinch pennies by using the same line for personal and business calls; it's inefficient and unprofessional. Install a second phone line for business calls, and consider a third line for fax. Additional lines are only about $15 or $20 a month, and they're entirely deductible.

Use a Headset Don't put a crick in your neck by cradling the phone all day. Mail-order catalog companies such as Plantronics (800/544-4660) and Hello Direct (800/444-3556) sell reliable headsets starting at $110 that work with most phones. Hello Direct also sells a cordless headset, called the Cordless, that leaves you free to roam around while talking. But it's expensive—$299.95—and if you live near a radio tower, as I do, it won't work very well. Hello Direct offers a 30-day money-back guarantee, however, so you might give it a try.

Get Voice Mail Call waiting is almost as irritating as a busy signal, and answering machines are the sign of a low-budget operation. The best solution is to get voice mail through the local phone company. In my area it's only $6 a month, it's convenient and professional sounding, and it's one less thing on your desk.

Pick Services Carefully Along with voice mail, your local phone company offers a numbing array of business services (Caller ID, distinctive ringing, and so on). Call forwarding—the ability to redirect incoming calls to another phone line—is one of the most useful services, particularly if you often work away from the office and carry a cellular telephone. But keep in mind that with cellular phones, you're charged for calls you receive, not just those you make, so your best bet is priority call forwarding (also called select call forwarding), a service that forwards only calls from phone numbers you designate.

There are many variations on call forwarding. Three particularly helpful ones are busy call forwarding, which redirects incoming calls to another line when you're on the phone; delayed call forwarding, which automatically forwards calls to a second line after four rings; and remote call forwarding, to set up your home phone to forward calls to your cur-

TEN SMART WAYS TO MANAGE YOUR MONEY

Setting up a home office requires financial planning. Here are some sound approaches that will get you started on the right path.

1. Hire an Accountant Unless you're completely familiar with tax laws, hire a CPA, at least for the first six months. Your accountant can help you make the most of deductions and get you going on the quarterly tax system, among other things. Also, ask your accountant to help you set up your books—that should save you from costly mistakes.

2. Develop a Business Plan Even if you're funding your own venture, devise a plan that outlines your business, your competition, how much money you expect to make in the first few years, and so on. Have your accountant or someone who's launched a similar business review it.

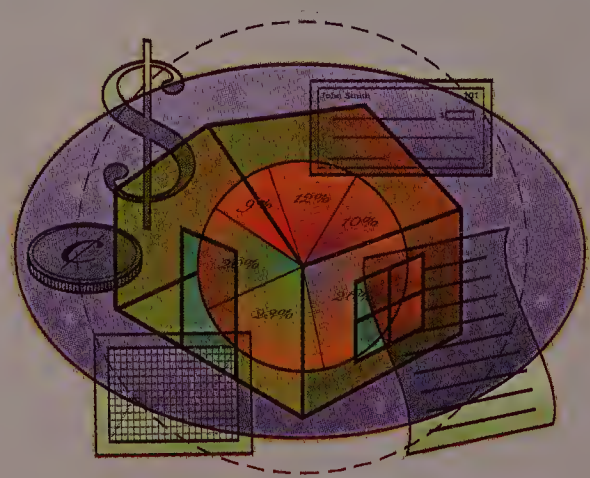
3. Keep Detailed Records Lots of expenses can be deducted—if they're legitimate and substantiated. Maid service, for instance, is partly deductible. To support the deduction, keep all related invoices and canceled checks.

4. Deduct or Depreciate? You've got two choices: Deduct the entire cost of equipment in the year you bought it, or depreciate it over five years. If you make lots of money during the year you bought the equipment, consider deducting the entire cost to lower your taxable income and self-employment taxes. If times are lean, depreciating the cost can spread the tax advantage over a period of years.

5. Investigate Local Regulations Many cities and municipalities tax home-based businesses. The laws vary widely—some cities don't charge home-based businesses any tax; others tax gross receipts and profits and impose an annual equipment tax as well. Zoning laws are another consideration.

6. Squirrel Money Away When you're self-employed, there's no such thing as a regular paycheck. Meanwhile, you've got quarterly taxes to contend with. A possible solution: Sink at least 35 percent of each check into a money market account. Use the money to pay your quarterly taxes, which usually amount to about 28 to 30 percent of earnings, and invest the surplus.

7. Get Health Insurance A self-employed person should have health insurance, whether it's an HMO package or a no-frills hospitalization-only policy. If you're healthy, a high annual deductible is the way to go—it can lower your monthly premium significantly. Some professional organizations offer group insurance to members.



8. Don't Forget Disability Disability insurance is almost as important as medical, but difficult to get. It's also expensive; for example, a 38-year-old male is likely to pay $1000 a year for disability insurance that will pay out only $2000 a month.

9. Contact Your Insurance Agent Make sure your insurance covers your office equipment. If not, add a business rider to your existing policy or buy a separate computer-equipment insurance policy. One company that offers insurance for office equipment is Safeware (614/262-0559), which charges about $100 per year to insure up to $10,000 worth of equipment. And if you have clients, delivery personnel, or others regularly coming to your house, consider adding liability insurance, too.

10. Plan for Retirement As much as you may enjoy working from home, you don't want to do it forever. Start a Simplified Employee Pension–Individual Retirement Account (SEP-IRA), which lets you salt away up to 15 percent of your net earnings.

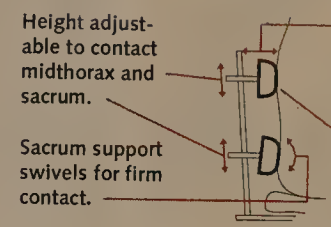
Why You Need a Good Chair, and How to Pick One

Leaning, hunching over, slumping, and sprawling at your desk for hours every day restricts your breathing; cuts off blood flow throughout the body; and eventually damages nerves, muscles, and joints. An upright, open, relaxed posture is the best defense against the effects of sitting, and good posture's best ally is a sturdy, adjustable chair. We'll illustrate with the chair most *Macworld* staffers use, the Zackback Computer Posture Chair (Zackback International, 507/252-9293). At $799, it's no impulse buy, but a posture-friendly chair could be the best office-equipment investment you make.

—Consulting by Terri Hansford, Hand Therapy of Oakland.

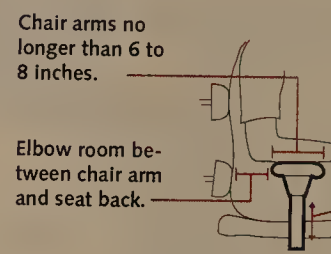
THE CHAIR BACK KEEPS YOU ERECT

The chair back keeps you sitting up straight—no tilting sideways, leaning forward, or letting your back collapse.



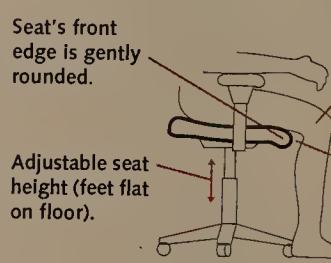
THE ROLE OF CHAIR ARMS

The key to good chair arms is really what they *don't* do: interfere with the position or movement of the upper arms, forearms, or elbows.



THE SEAT PAN: YOUR FOUNDATION

A stable seat pan distributes and absorbs the weight of your body and balances you so that you relax.



rent location. Expect to pay about $3.50 per month for each of these services.

Consider an ISDN Line Those who need to send and receive large files frequently, get on the Internet for lengthy periods, or participate in videoconferencing will probably need ISDN (available from phone companies in most major urban areas).

Be forewarned, though: ISDN requires special equipment—a network terminator and a terminal adapter—that can cost hundreds of dollars. You'll also face hefty installation fees (around $125 for the service, $35 for the ISDN line), although some phone companies will waive the fees if you agree to keep the service for two years. Also, your Internet service provider might charge a higher monthly rate for ISDN access. And because ISDN is still bleeding-edge technology, some of your clients or suppliers may not have it.

Occupational Hazards

The good news about working from home or telecommuting is that you don't have your boss or colleagues around to interrupt or tell you what to do. The bad news is that you don't have your boss or colleagues around to offer guidance, camaraderie, and coffee talk. Here are some strategies to keep you from feeling as if you've been banished to San Quentin.

Work out of the House Just because you work *from* home doesn't mean you have to always work *at* home. Whenever possible, take your work out of the house. I often take my reading material to a neighborhood café, and my PowerBook 170's black-and-white screen is easy to read outdoors on a sunny day.

Keep the Kids at Bay Bluntly put, working from home is no substitute for child care. You need to focus your attention during the day on bringing home the bacon, not chasing down the children, so keep the kids in day care. When there are children in the house, arrange for another adult to supervise them. Post a "Do Not Disturb" sign on your door. If necessary, buy a coffeemaker and a small refrigerator for your office. That will keep you from sneaking into the kitchen, where a bored child lurks.

Network, Network, Network For many people, the isolation that comes with working at home can be unsettling and disconcerting. Make a point of visiting a colleague or friend during the day occasionally and meeting clients at their offices. Breakfast get-togethers don't intrude much into the workday.

The Last Word

Ultimately, the most important advice is also the simplest. Think everything through as much as possible before you spend any money. Postpone those decisions you just can't make. And above all, research all your options. The less money you spend on equipment, monthly phone services, and other essentials, the more cash you'll have for yourself.

As for me, I replaced the ink-jet printer with a laser model two years ago. The cordless phone stays in the kitchen, because I now have a two-line telephone in my office. I only use the glass-topped filing-cabinet desk when paying bills; my Mac rests on an ergonomically designed desk with an adjustable keyboard tray.

And the lawn chair? I still have it, but it stays outside where it belongs. On a sunny day, you just might find me in it—working away contentedly, a PowerBook in my lap. For me, that's what a home office is about—the freedom to truly work when, how, and where I want. **m**

Former *Macworld* editor JAMES A. MARTIN works from home—and occasionally from the beach.

Are you getting the performance out of

New Back-UPS® Pro™ increases productivity and peace of mind.

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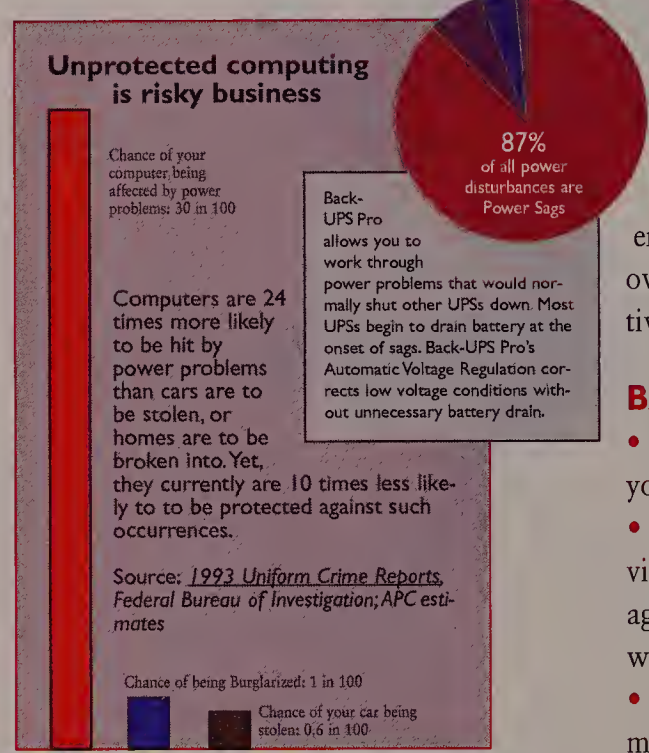
FOR AS LONG AS YOU OWN THIS PRODUCT, IF YOUR PROPERLY CONNECTED EQUIPMENT IS EVER DAMAGED BY AN AC SURGE, INCLUDING SURGES DUE TO LIGHTNING, APC WILL REPAIR OR REPLACE OUR PRODUCT AND UP TO $25,000 OF CONNECTED EQUIPMENT (SEE POLICY FOR DETAILS, VALID IN U.S. AND CANADA ONLY).

If you're using a computer, few things are more certain or more discouraging than power problems. If you haven't yet lost productivity and data to a blackout, crashed a hard drive, or toasted a modem, you will. It's almost a statistical certainty.

More than 4,000,000 smart computer users protect against the inevitable with affordable: award winning power protection from APC. One prevented problem is all it takes to pay for proper power protection many times over.

Back-UPS Pro, protects all power paths leading to your Mac, keeping your equipment safe from power events including surges, swells, brownouts, and blackouts - and keeping you safe from downtime that power problems inevitably produce. Back-UPS Pro provides high-performance workstation protection, preventing data loss, increasing your system's lifespan, and improving productivity.



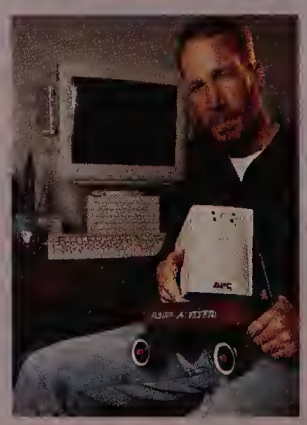
Unmatched Protection With Automatic Voltage Regulation

A study by Bell Labs indicates that 87% of all power disturbances come in the form of a power sag, or "brownout." Most UPSs begin to drain battery at the onset of sags, giving you a few moments to shutdown your computer. Automatic Voltage Regulation allows you to work through power problems by increasing voltage during brownouts and decreasing voltage during surges without draining battery power. In environments where chronic brownouts and overvoltages are the norm, the line-interactive Back-UPS Pro is essential.

Back-UPS Pro UPSs Feature:

- Instantaneous battery backup to protect your data against a total loss of power.
- Automatic Voltage Regulation (AVR) provides the edge you need for full protection against extended brownouts or overvoltages without draining the battery.
- CellGuard™ intelligent battery management dramatically extends battery life with fast recharge and deep discharge protection. Battery diagnostics warn you before problems occur.
- Batteries are quickly and safely user-replaceable without needing to shut your system down. (Batteries last 3-6 years under normal use).
- $25,000 lifetime repair/replace guarantee against surge damage to your equipment (see details).
- Built-in phone line/10Base-T network cable surge protection for a bulletproof response to anything Mother Nature sends in your direction.

So don't wait for the school of high shocks to teach you an expensive lesson about Mac performance. Ask for APC today.



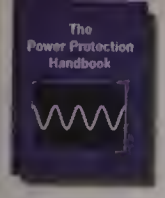
More than 4,000,000 satisfied users say "Protect Me! with APC"

CLOCKWISE: "After 13 plus years in the computer industry (with both Apple ond Digital), I have changed directions and now live in the Sonto Cruz mountains, where the power is as bad as the view is beautiful," says Harald Striepe. "Now I spend most of my time consulting and writing fiction. The power is the worst during rainy season and brownouts ore a doily occurrence. But, not o problem for me since I got my Back-UPS Pro with AVR - now, I work through the rainstorms."

"I om the Product Development manoger for Radio Flyer," says Antonio Pasin. "But quite often, I work at home, where I pay for all the equipment....my TV has been zapped in the post (it turned GREEN!). Here, I don't hove an extro $1200 to replace the DAT tape backup...an investment in APC is more cost effective for me. But besides just protecting the hardware, I look it it as protecting my media...I have lots of time invested in my data, and Back-UPS Pro protects that os well. Not to mention the unit is well-designed, easy to use, and APC provides greot customer service to boot."

"I am a graphic designer/illustrator, using mostly 9500/132 and 8100/80 PowerMacs, in central Florida, the lightning capitol of the world," said Thomos Sessions of Sessions Design in Orlondo. "We lose power on o weekly bosis ond have constont outoges....I've used APC for at least 8 years, but Back-UPS Pro is my current favorite - it hos a smaller footprint and I can plug in my modem. Before UPSs, when we heard o thunderstorm, you would just hurry ond try to get the work done, then just shut down- unplug the machines and take a break.....now I wouldn't work without one....porticulorly in this deadline oriented industry."

Visit APC's PowerPage™ on the WorldWide Web at http://www.apcc.com



Protect Your Mac. FREE 60-page Power Protection Handbook

What are the myths and musts of power protection? What ore the 10 most common power protection mistakes? The top tips for adding reliobility to your Mac? Get your FREE copy ond find out!

☐ YES! I'm interested in Back-UPS Pro for advanced PowerMac protection. Please send my FREE handbook and Back-UPS Pro information.

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"Ultimately, it's more a question of when - and not if - you should buy a UPS... UPS power protection has never been cheaper or more convenient"

MacWEEK

"If you have a server and don't have a UPS, you're playing with fire."

MacUser

"★★★★...Should be standard equipment on every desktop... effective, affordable, designed to last."
- *PC Computing*

"99 out of 100"
- *Computer Gaming World*

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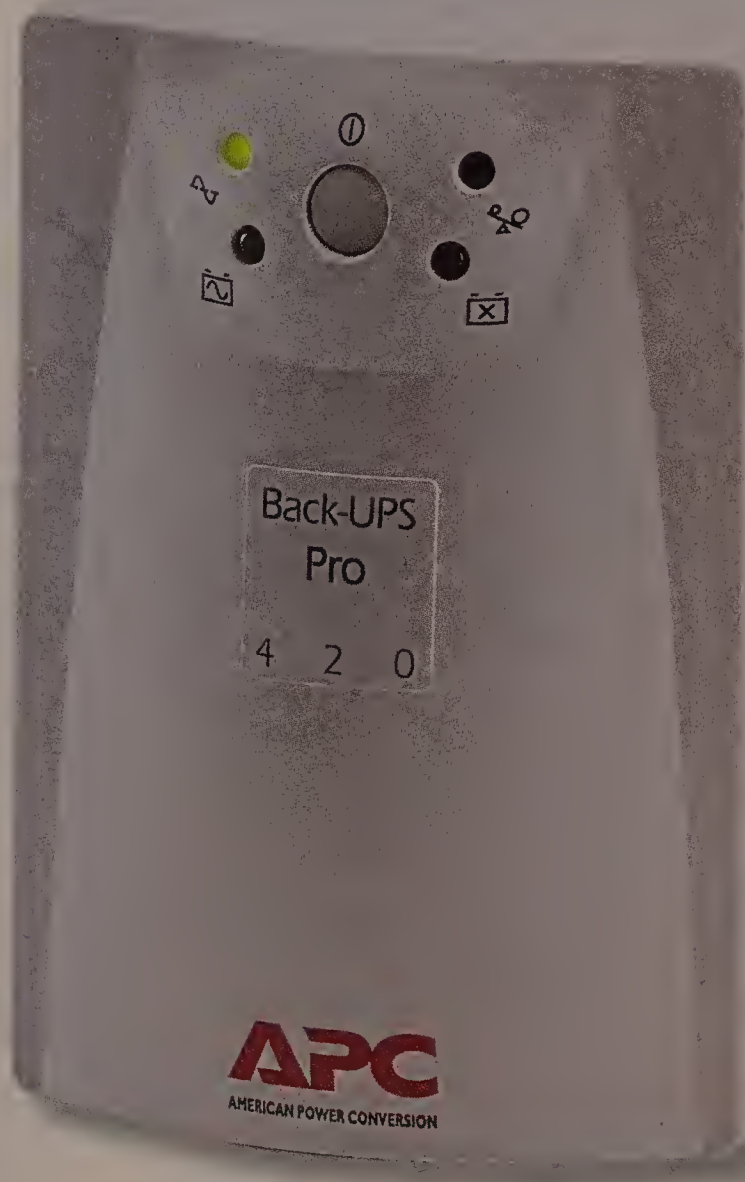

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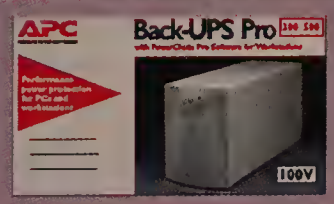

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Model	VA Rating	List Price
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Back-UPS 280	280	$139
Back-UPS 400	400	$199
Back-UPS 450	450	$254
Back-UPS 600	600	$359
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How to choose from the new generation of innovative input devices

SmartInput

by Franklin N. Tessler, M.D.

JUST A FEW YEARS AGO, WITH ONLY A HANDFUL OF PRODUCTS TO choose from, most people barely gave a second thought to buying a keyboard or pointing device for their Mac. Today, Macintosh-compatible mice and trackballs come in an astonishing range of styles and shapes, and newer rivals like touchpads have appeared on the scene. Even the familiar flat keyboard may be heading the way of the dinosaur, with stiff competition from angled and split designs that claim ergonomic superiority. In the first part of this article, I offer some practical advice on how to choose an input device that's right for you and the type of work you do. Next, I review what's available, with an emphasis on products that are new or stand out from the crowd. (For a look at recent developments in voice-recognition technology, see the sidebar, "His Master's Voice: Solution for RSIs.")

Hardware That Fits

Most people take the easy way out by accepting any keyboard and pointing device that comes bundled with their system—it's no wonder that so many are unhappy later when they discover that their hardware doesn't work for them, or worse, causes them serious harm. (For a review of some of the adverse health effects of computers and ways to avoid them, see "Safer Computing," *Macworld*, December 1994.)

So before you take the plunge and buy that new Mac, take the time to answer three basic questions: What type of work do you do? What does your work area look like? What type of input device fits you best? As you answer these questions, don't assume that you have to use your company's standard-issue equipment—many managers realize that they save money in the long run by paying attention to workers' special needs. If you're unsure about your employer's policy, check with your supervisor. To help guide you, the diagram "Input Devices: No Perfect Choice" summarizes the advantages and drawbacks of several kinds of pointing devices—trackballs, mice, and touchpads.

Fresh Input Some innovative products—from top to bottom, MicroQue's QuePoint II touchpad, Itac Systems' Mouse-Trak trackball, Infogrip's BAT Personal Keyboard, and Kensington Microware's Thinking Mouse 5.0—can help make input a less hazardous practice.

Type of Work If you spend most of your time working with traditional word processing or spreadsheet applications, you'll be happiest with a mouse, trackball, or touchpad. But if a significant portion of your workday involves graphics, you may prefer a drawing tablet, which I do not cover in this article. Fortunately, the Apple Desktop Bus (ADB) architecture built into all Macs lets you keep several input devices hooked up at the same time, so you can switch back and forth without rebooting. (In fact, alternating your pointing device may actually help prevent repetitive strain injuries, or RSIs, one type of computer-related disorder.)

Other less-conventional pointing devices are worth considering if you're not deskbound. For instance, touch-sensitive monitors and light pens are ideal when there's no room for a mouse or trackball, or for casual use by passersby with no computer experience. And cordless mice that send signals to an infrared receiver are a good choice for stand-up presentations where you can't afford to be tethered to the computer.

His Master's Voice: Solution for RSIs

FOR MANY, THE ULTIMATE INPUT DEVICE WOULD BE THE ONE THEY'VE USED SINCE CHILDHOOD—THE HUMAN VOICE. THAT'S THE PROMISE OF POWERSECRETARY, AN ALL-SOFTWARE, SPEECH-DICTATION SYSTEM FROM ARTICULATE SYSTEMS. THIS FUTURISTIC-SOUNDING MARVEL ALSO CARRIES A FUTURISTIC PRICE TAG: $2500 ($1000 FOR A WORDPERFECT-ONLY version). The program also demands 12MB to 19MB of free RAM, weeks of patience as it learns to understand you, and a Mac with 16-bit sound (such as a PowerPC-based Mac or a PowerBook—except the 5200, 6200, and desktop 5300 lines). See *Reviews, Macworld,* September 1995, for specifics.

To dictate to the program, you speak naturally, except that you leave a short gap between words. Once you've launched PowerSecretary as a background program—a 70-second delay—the program generally does an impressive job of recognition, rapidly slapping words into any program you use (except Word 5 and Microsoft Works—admittedly significant omissions).

On one hand, the program surprises you with its tolerance for steady background noise and, sometimes, its contextual intelligence; for example, if you say "hundred" after a digit, the program types 00 instead of *hundred.* On the other hand, the program makes mistakes even when being used by a veteran; when it has no context—for example, when you're editing text or beginning a sentence—it might type *your* when you mean "you're." Therefore, 55 words per minute, including corrections, approaches the program's top speed. This may sound slow, but if RSIs prevent you from typing, it's the height of productivity. (For a QuickTime movie of PowerSecretary, check *Macworld*'s software library on America Online or http://*www.macworld.com*.)

You can also define your own recognized phrases, such as your complete return address when you say "return address." Clearly, the more macros you use, the more time and effort you save.

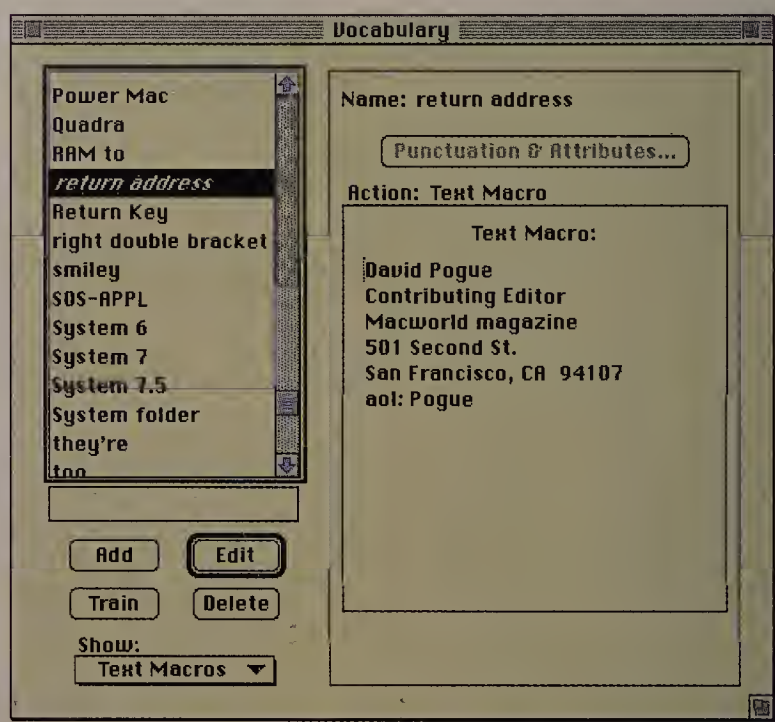
Because of PowerSecretary's rich ties to QuicKeys and AppleScript, you can use the program to control your Mac as well as to dictate to it: you can easily choose menu commands, launch programs, and even click the mouse using voice commands. This feature dramatically improves PowerSecretary's appeal as a productive input device. When reading an E-mail, for example, you might say, "reply to this"; a QuicKey macro could highlight what you're reading, quote it in a response E-mail, sign your name, and plant the insertion point above your signature, ready for your dictated response—all at lightning speed.

For now, on the Mac, there are few alternatives to PowerSecretary. Apple's PlainTalk 1.4, for Power Macs, is reliable, intuitive, and free (download it from *ftp.support.apple.com* or an online service). PlainTalk, however, doesn't take dictation or control programs; all it does is *open* things, such as documents, programs, and AppleScript applets.

PowerSecretary can reduce your keyboard to little more than an on/off switch; once you're good at dictating, you'll use the keyboard primarily to set up macros, AppleScripts, and so on. With QuicKeys, PowerSecretary easily replaces the mouse button (you say "click here," "shift-click," and so on). If not for the clumsiness of moving the cursor by voice, PowerSecretary could replace the mouse altogether.

Until PowerSecretary's steep price and learning curve decrease, it won't be a tool for the masses. But for those who can't or shouldn't type, PowerSecretary can be a career saver (as it was for me). It's also worth considering for anyone who spends time dictating standard clauses or terminology—or anyone who wants a little glimpse of the future.

—DAVID POGUE



Macros Make the Difference PowerSecretary's power increases if you teach it your own "text macros"—short verbal triggers that produce long, complex typed passages.

Your Workspace The setup of your workspace is another important consideration in selecting an input device. For example, if space is tight, you may not be able to spare 6 square inches for a mouse. Trackballs, which are larger than mice but stationary, are a better choice for cluttered desktops, and touchpads are even more compact. If you're really cramped, you may even want to consider getting a keyboard with a built-in pointing device.

Environmental Conditions This is another important factor few people think about when choosing a pointing device. If your workplace is exposed to dust or moisture, standard mice and trackballs may function erratically or require frequent cleaning or repair. Touchpads, which are sealed and contain few moving parts, may be more suitable for harsh conditions. Some vendors, such as Itac Systems, even sell industrial-grade trackballs that feature extrastrong seals and impact-resistant cases.

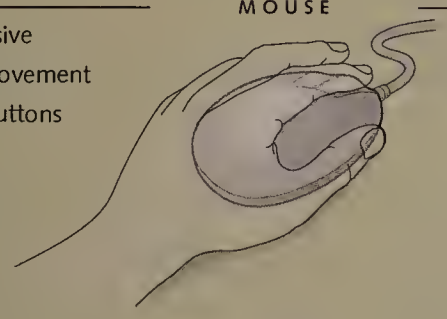
Fit the Device to You It's unfortunate that computer users force themselves to adapt to their hardware instead of the other way around. Stroll through any office and you'll see people with their bodies contorted into unnatural positions to accommodate their keyboard or pointing device. But paying attention to a few basic principles—keeping your wrists straight and taking frequent breaks, to name just two—can help prevent disabling injuries.

Input Devices: No Perfect Choice

MOUSE

PROS
- Relatively inexpensive
- Very little finger movement needed to reach buttons

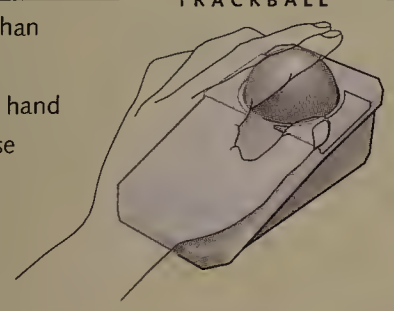
CONS
- When gripped too tightly can cause muscle strain
- Uses more desk space than other pointing devices
- Must be cleaned regularly



TRACKBALL

- Uses less desk space than mouse
- Requires less arm and hand movement than mouse

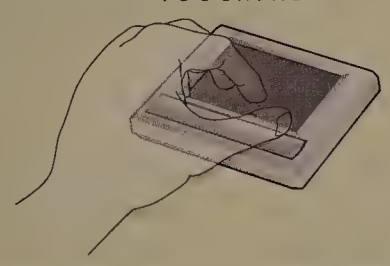
- Wrist is bent during use
- More finger movement needed to reach buttons than with other pointing devices



TOUCHPAD

- Small footprint
- Least prone to dust

- Places more stress on index finger than other pointing devices do
- Small active area makes precise cursor control difficult



Despite manufacturers' claims, no single type of pointing device is clearly superior for routine jobs like word processing. Whatever pointing device you choose, though, it's important to make sure that it fits you like a glove: Can you use it with your arm and hand relaxed, or do you have to grip it tightly? Are the buttons easy to reach, and do they provide adequate tactile and auditory feedback? If you're auditioning a trackball, make sure the ball lies at a comfortable height and that it rolls smoothly, without excessive play or resistance.

Because the only surefire way to tell if a pointing device is right for you is to try it for an extended period, buy one from a vendor with a liberal return policy. (For example, Kensington offers a 30-day trial period on all of its input devices, a practice I wish other manufacturers would follow.) And if you think you may be suffering from a disorder that was caused or exacerbated by a keyboard or pointing device, it's a good idea to consult a knowledgeable health-care professional before you choose a new device.

Armed with the general principles I've outlined, you're ready to go shopping. The following product guide will help you narrow your choices. I haven't covered every keyboard, mouse, and trackball available—like hard drives, they've become commodity items differentiated largely by price. Nor did I include the wealth of PC-compatible devices on the market, although you can now use most of them on a Mac by purchasing the $99 KeyStone adapter from the Silicon Valley Bus Co. (408/623-2300, *silibus@applelink.apple.com*). See the table, "A Handful of Input-Device Data," for the range of products evaluated for this article.

Key Options

In the past, keyboard options were limited to a row of function keys or an integrated numeric keypad. Fortunately, the picture is changing as vendors strive to overcome the poor ergonomics of conventional keyboards (see the diagram "Bad Angles.") The most radical text-input devices hardly resemble keyboards at all, with limited numbers of keys or small switches that respond to tiny finger movements—in each case, the aim is to reduce stressful repetitive motions to the bare minimum and thereby lessen the risk of injury.

The least expensive alternative keyboards adapt conventional designs, but none offer an ideal mix of ergonomic features. For example, the Microsoft Natural Keyboard and the Adesso Tru-Form keyboard both feature split, tilted designs that reduce pronation and ulnar deviation—hand positions that may contribute to RSIs—but neither design lets you adjust the split angle to fit your posture, as the Apple Adjustable Keyboard does. Still, you can't tilt the two halves of the Apple keyboard away from each other, so pronation is still a problem.

Adesso's Tru-Form keyboard comes with a built-in pointing device that works like the one on some IBM notebooks. You move the cursor by pressing your finger

against a rubberized knob located near the center of the keyboard—the harder you push, the faster the cursor moves. (Recessed buttons in front of the spacebar let you click and click-lock.) The built-in pointer works fine with menus but makes selecting text more awkward than with a mouse or trackball.

Although keyboards like Microsoft's are better for you than traditional flat models, they still take a one-size-fits-all approach; for a lot more money, you can move up to the next level. For example, the $795 Comfort Keyboard system (from Health Care Keyboard) goes the extra mile by letting you adjust the height and angle of each of its three sections to suit your body and work setup (see the photo, "Adjusting to Your Needs.") You can raise, lower, or angle each part independently, so it takes a lot of trial and error to find an arrangement that works, a significant inconvenience if you have to share the keyboard with someone else. The keys follow the familiar QWERTY layout, so the learning curve isn't nearly as steep as with some of the more exotic designs.

The BAT Personal Keyboard, from Infogrip, is an innovative input device that has only seven keys. Since there isn't a separate key for every character, you have to press more than one key at a time to type most characters, a procedure known as *chording*. Infogrip sells separate units for the right and left hands, but you can enter any character using either hand. The BAT connects directly to the Mac's ADB port without an adapter box, and it works equally well on a desktop or perched on your lap. Anyone used to a standard keyboard will need many hours of concentration and practice to get up to speed, although Infogrip claims that you need only an hour or so to learn chords for letters and numbers. (I used the BAT for several hours, but still had to refer to the cheat sheets; other people's mileage may vary.) A minor complaint: the BAT doesn't let you give up your mouse, since there's no built-in pointing device. Infogrip is also touting the BAT as an auxiliary input device for macros—you still use a keyboard for typing, but you program the BAT to perform shortcuts like entering your address.

The most unusual text-input device I looked at has no keys at all. Like the BAT, the DataHand comes with individual units for the right and left hands, but you need both parts to enter the complete character set. Your hands rest on padded plastic cases sculpted to match the palm's natural contours, and your fingers fit into receptacles with small switches on the sides and bottom. DataHand Systems claims this setup reduces stress on the fingers. (Technically, the DataHand isn't a chording device, since you enter most letters and numbers by pressing only one switch at a time.)

Although I didn't have enough time to become proficient at entering text, I was able to type complete sentences after only an hour or two. Unfortunately, the tutorial that ships with the DataHand runs only under Microsoft Windows. Unlike the BAT, the DataHand lets you get by without a separate pointing device, since you can move the cursor using your index fingers. Even with practice, though, I found it very hard to control cursor movements reliably.

Are high-end keyboards like the DataHand worth the considerable extra cost? If your conventional keyboard isn't causing you any pain, the answer is probably not, although switching to a relatively inexpensive split design like Adesso's Tru-Form is a good idea if you're looking for a new or replacement keyboard. (Wisely, vendors are careful not to advertise that their keyboards can actually prevent RSIs, in part because such claims are hard to back up and may lead to investigation by the Consumer Products Safety Commission.) If you're already suffering, though, $1000 may seem like a small price to pay if it allows you to continue working without making your injury worse.

A Handful of Input-Device Data

	Company	Product	Star Rating *	Company's Estimated Street Price **
Pointing device				
	Fellowes	Mouse Pen Mac 3.0	★★★/5.1	$39.99
	FTG Data Systems	PenDirect ADB	★★★/5.0	$398.00
	Interlink Electronics	RemotePoint	★★★/6.4	$159.95
	Kensington Microware	Editors' Choice Thinking Mouse 5.0	★★★★/7.4	$89.99
Text-input device				
	Adesso	Tru-Form	★★★/6.7	$89.00–$99.00
	Apple	Adjustable Keyboard	★★/4.7	$119.00
	DataHand Systems	DataHand	★★★/5.8	$995.00
	Health Care Keyboard	Comfort Keyboard	★★★/6.0	$795.00
	Infogrip	BAT Personal Keyboard	★★★/6.1	$199.00 each, $349.00 for two
	Microsoft	Microsoft Natural Keyboard	★★★/5.6	$99.95
Touchpad				
	Alps Electric	Desktop GlidePoint	★★★/6.0	$99.95
	Cirque	GlidePoint Desktop	★★★/6.0	$99.95
	Hagiwara Sys-Com	PointPad	★★/4.4	$89.00
	MicroQue	Editors' Choice QuePoint II	★★★★/7.0	$74.95
	Touché Technologies	TouchPad	★★/4.3	$59.95
Trackball				
	Itac Systems	Editors' Choice Mouse-Trak	★★★/6.2	$179.00
	Kensington Microware	Turbo Mouse 5.0	★★★/5.9	$109.99
	MicroSpeed	MacTrac Deluxe	★★★/5.2	$99.00

** Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full*

Mice and Trackballs: The Next Generation

With so many mice and trackballs on the market, it's getting hard to tell them

Phone	Warranty (in years)	Comments
708/893-1600	1	Penlike pointing device works on many surfaces, including clothing.
714/995-3900	2	Less precise than touch screen. Works with existing monitors.
805/484-1331	1	Wireless, so it's good for stand-up presentations but not desktop use.
415/572-2700	5	Four-button mouse with excellent ergonomics and software.
213/294-4300	1	Good split-keyboard design with integrated pointing device.
408/996-1010	1	Adjustable split. Small function keys.
602/860-8584	2	Costly. Requires much less arm and hand motion than other text-input devices.
414/536-2160	2½	Costly. Separate sections adjust independently.
805/652-0770	1	Chording device takes time to learn. Good for entering macros.
800/426-9400	2	Inexpensive split keyboard with integrated wrist rest.
408/432-6000	5	Includes adjustable base and edge detection.
801/467-1100	lifetime	Similar to Alps product but without adjustable base.
619/546-9989	1	Responds to direct pressure. Awkward for dragging.
801/263-1883	lifetime	Excellent touchpad with customizable application settings.
415/331-6622	lifetime	Small buttons. 8utton functions can't be customized.
214/494-3073	1	Costly but well-built trackball with good ball dynamics and padded wrist rest.
415/572-2700	5	Extensive programmability. Slight play in ball.
510/490-1403	1	Good basic trackball.

explanation.) *** Actual prices could be higher or lower than the estimated street price provided by the company.*

apart. In place of the single button that Macintosh users once considered sacrosanct, two-, three-, and even four-button designs are becoming commonplace. For mice, a softly rounded contour that fits the palm of the hand is ideal. The best products, like Kensington's Thinking Mouse, also sport welcome touches like rubberized sides that make it easier to hold the mouse without gripping it too tightly. In trackballs, the trend is toward switches that are large and easy to press and balls that roll smoothly. Of the trackballs I tested, my favorite by a whisker is the Mouse-Trak, from Itac Systems. Although I prefer the feel of the switches on Kensington's Turbo Mouse, the Mouse-Trak comes with a built-in padded wrist rest and its ball rolls with less play than other trackballs.

While vendors used to rely on Apple's Mouse control panel to adjust cursor response, all the top mice and trackballs now come with software that easily outshines Apple's. I especially like the software that comes with the Kensington mouse and trackball because of the way it lets you customize the cursor's sensitivity to mouse or trackball movement. A feature called Brilliant Cursor lets you define locations on the screen as HotSpots. With Brilliant Cursor turned on, the cursor automatically zips to the nearest HotSpot when you move the mouse or ball in that direction, a real boon if you have a large monitor. Kensington's software also lets you program any of the four buttons of the Thinking Mouse to perform timesaving shortcuts like typing your name or ejecting a disk.

Pointing the Way

If you're one of those people who can't tolerate even the minimal arm motion that a trackball demands, then you may prefer a touchpad. Like the TrackPad on Apple's PowerBooks, touchpads let you control the cursor with your finger. About the same size as a mouse, touchpads are flat, rectangular devices that use a very weak electrical field to sense your touch. (Hagiwara Sys-Com's PointPad is an exception: it responds to direct pressure.) As you move your fingertip, the cursor follows the movement. You click by tapping your finger on the pad's surface or by pressing buttons at the top, bottom, or side of the pad.

One of the biggest advantages of touchpads—their compact footprint—also turns out to be a liability. Because the active area is so small, you can run out of room when you're dragging the cursor across a large monitor. All of the touchpad vendors offer slightly different solutions to the problem. For example, the Edge Motion feature in Touché Technologies' TouchPad automatically keeps the cursor moving even when your finger runs out of space. The Desktop GlidePoint from Alps Electric keeps an item selected for a moment after you lift your finger, giving you time to reposition it and continue dragging. The GlidePoint also includes a tilting base to help you find the least stressful angle.

Adjusting to Your Needs The three sections of the Comfort Keyboard (from Health Care Keyboard) bend, twist, and tilt independently to accommodate each individual's precise ergonomic demands.

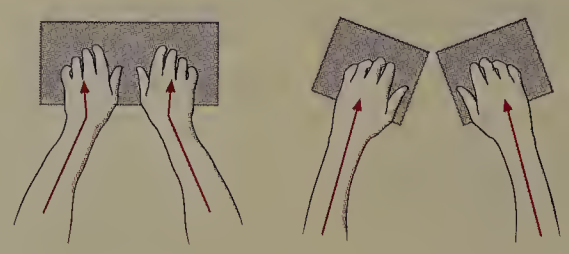
Bad Angles

Conventional keyboards, like those on the left, force the wrist and hand into stressful positions. Newer designs, shown on the right, fit the body's natural posture.

CONVENTIONAL APPROACH — BETTER APPROACH

OUTWARD BEND

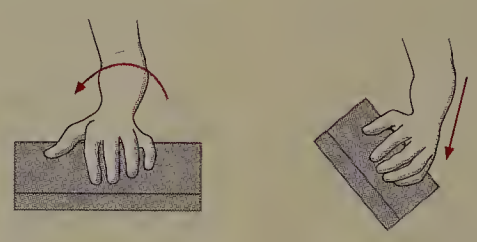
Wrists need to bend outward—not a natural position—when you type on a conventional keyboard.



A split keyboard may help by encouraging a straighter position for the wrists while you're typing.

THE TWIST

Flat keyboards require that the hand also be flat (horizontal). This puts a stressful twist on the forearm called pronation.



A keyboard that tilts sideways can put the forearm in a more natural position, reducing stress.

BACK TILT

A keyboard that slants up causes hands to tilt up and back, placing stress on the wrist.

A flat keyboard (or even one that slants down slightly) encourages a straighter wrist.

Like the best mice and trackballs, most touchpads come with software that lets you program their buttons to perform handy shortcuts. I especially liked the software that comes with MicroQue's QuePoint II, which lets you customize button action, cursor acceleration, and touchpad response, as well as other features, for specific applications. When you launch a program, the QuePoint II's settings load automatically.

At first glance, touchpads may seem like the ideal pointing device: they're compact, they resist dirt and water, and they're as intuitive as can be. Unfortunately, while touchpads may put less stress on the large muscles of the arm and shoulder than mice or trackballs do, they force the index finger to do most of the work. (Although you can use any finger to operate a touchpad, it's easiest to point with your index finger.) After using the touchpads mentioned in this article for only a few weeks, I noticed that my index finger was starting to ache. I had to consciously remind myself to keep my finger relaxed.

Other pointing devices are available for special applications. For example, Interlink Electronics' RemotePoint is an excellent solution for stand-up work, like presentations, where a mouse or trackball won't do. The RemotePoint is a compact, handheld device that communicates with a small infrared receiver that plugs into the Mac's ADB port. It works reliably at distances up to 40 feet, but you need to maintain a clear line of sight to the receiver. You control the cursor by pushing your thumb against a rubberized disk on top of the RemotePoint.

For applications like computerized information kiosks, Elo TouchSystems (423/482-4100) offers a line of touch-sensitive monitors that let you use your finger to point and click. I found it surprisingly easy to perform routine tasks like closing windows or selecting menus with Elo's 17-inch TouchMonitor, and the image quality was comparable to that of other top-of-the-line monitors I've used.

If you can't afford a new monitor, FTG Data Systems' PenDirect ADB lets you control the cursor using a special pen. Unlike the Elo touch screen, the PenDirect works with most existing monitors through an interface box that connects to the Mac's video and ADB ports. In my trials, however, the PenDirect was a bit less precise than the Elo monitor.

The Last Word

Although I was able to pick a clear winner in every major category except text input, there are no panaceas. The cardinal rule is that input devices are personal items: what works for someone else may not be right for you. Whether you use a Mac at home or at work, take an active role in choosing your pointing device and keyboard and don't just settle for what you're given. If you're buying a complete system, ask the dealer if you can substitute the keyboard or pointing device that you like. You'll be glad you did. **m**

Contributing editor FRANKLIN N. TESSLER is a radiologist with a special interest in input devices and ergonomics.

INPUT DEVICES

Input devices are personal items, but these top picks provide the best balance of ergonomic design, features, and cost-effectiveness.

Pointing Device

★★★★/7.4 **Kensington Thinking Mouse 5.0** Good ergonomics, award-winning software, and strong support make this mouse a standout. **Company:** Kensington Microware. **Company's estimated street price:** $89.99.

Trackball

★★★/6.2 **Mouse-Trak** This rugged trackball sports a comfortable wrist rest and a smoothly rolling ball. **Company:** Itac Systems. **Company's estimated street price:** $179.

Touchpad

★★★★/7.0 **QuePoint I** Although it looks like other touchpads, the QuePoint's customizable software puts it ahead of the pack. **Company:** MicroQue. **Company's estimated street price:** $74.95.

Text-Input Device

No choice; each keyboard works for different situations, so base your decision on your particular needs.

Starting at $3799

Power Computing Introduces Fastest MacOS System Ever

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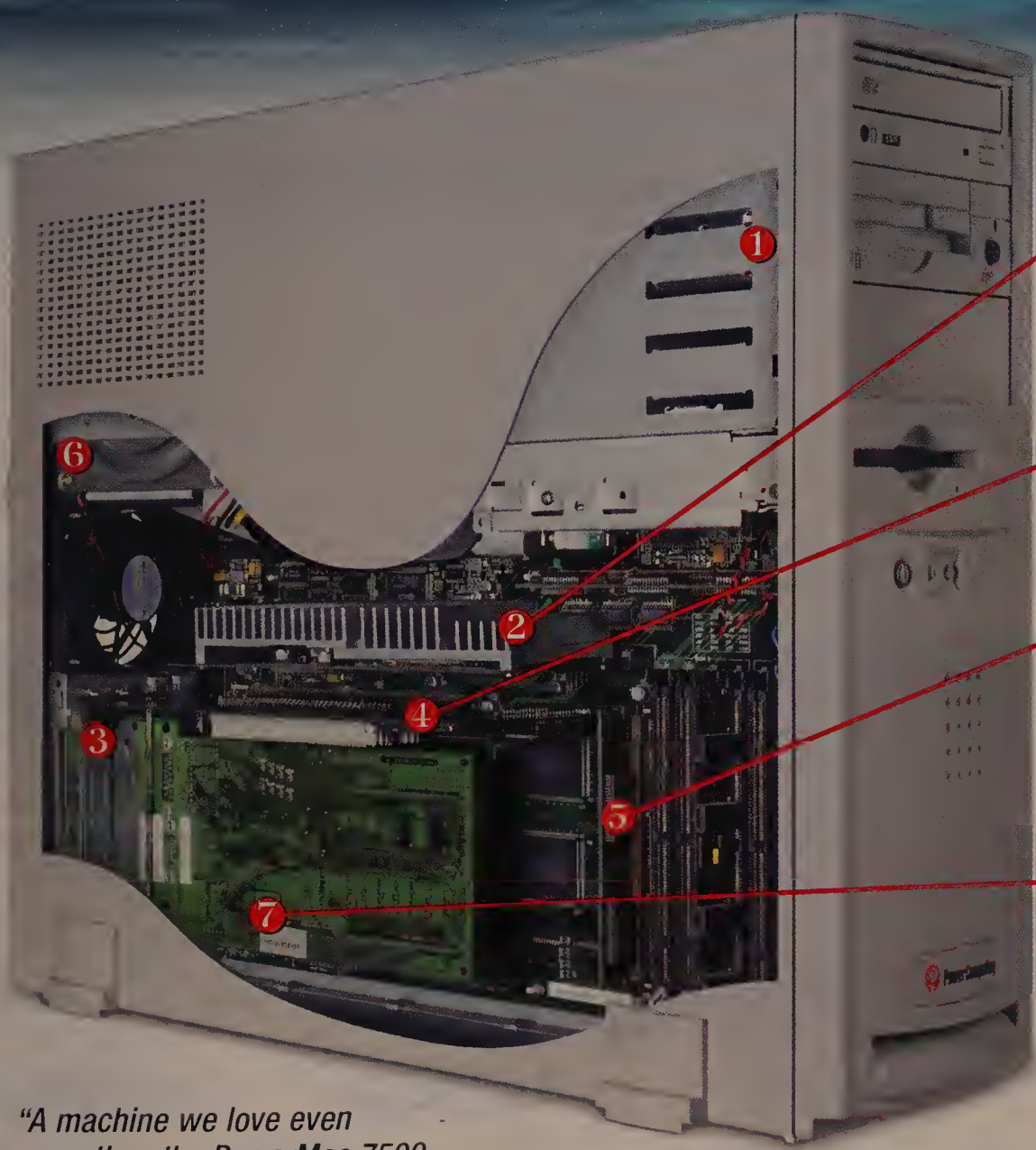

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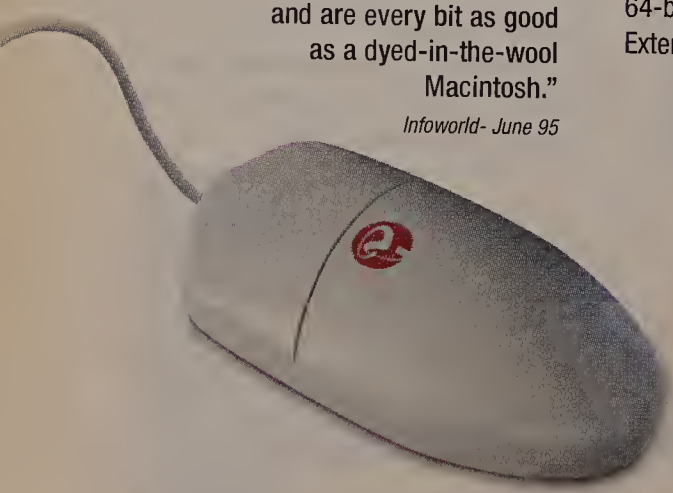

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EVEN THOUGH IT'S THE MOST POPULAR DESKTOP MACHINE POWERED BY RISC PROCESSORS, YOUR MACINTOSH ISN'T IN THE SAME class as a screaming RISC-based workstation running Unix. But because such workstations can cost three to four times what your typical desktop machine does, few companies can afford to dedicate one to every employee who needs one. A more economical solution: let users access these Unix powerhouses remotely from their desktops via a standard communications protocol called X Window (it's singular, not to be confused with Microsoft Windows), which provides a graphical interface similar to your Macintosh's.

The X Window standard—colloquially known just as X—was designed from the start to run independent of the desktop machine and the underlying network. X Window reverses the terms *client* and *server* as Macintosh users know them. The clients—the X applications themselves—run on the beefy Unix hardware; but the X server software, which controls the X apps remotely (in the same way that remote-access programs such as Farallon Timbuktu and Microcom CarbonCopy control a Mac remotely), runs on each user's Mac. This setup lets you access expensive Unix applications—for instance, database, engineering, or scientific applications that may not even be available on the Mac—from your own Mac desktop.

MW LAB

To help you select the best X server for your situation, Macworld Lab tested four products—Apple's MacX 1.5, XoftWare for Mac OS 3.0 (previously from AGE Logic, which NetManage bought in November), White Pine's Exodus 5.2.1, and Tenon Intersystems' XTen 6.0. Using an IBM RS/6000 Model 250 workstation running AIX as a Unix host, we ran a standard X benchmark and interactive tests on a Power Mac 8100/100 to evaluate performance. We also compared each X server with two other versions of the Unix operating system—Silicon Graphics' IRIX and Sun Microsystems' Solaris—to see how well the servers dealt with differences between X implementations. And to compare the Mac-based X servers with similar applications running on Windows-based servers, we ran the same performance tests on Walker Richer Quinn's ReflectionX 4.1, which runs on Windows NT. Our results bordered on predictably dull: all of the Mac products came through as capable, well-performing X servers. The distance between the standouts we designated as Editors' Choices and the other two products was mighty small. Which product you choose depends on how Unix-savvy you and your end users are, and the brand of the Unix hosts you must support.

Great Xpectations

Of the four products we tested, three are remarkably similar; the other marches to the beat of a different drummer. Apple's MacX and NetManage's XoftWare for Mac OS are nearly identical, since they're both based on Apple's original MacX code. White Pine's Exodus, though not a MacX clone, nonetheless sports a similar look and feel. Tenon Intersystems' XTen is unique in that it is embedded in a full-blown implementation of Unix that runs under the Macintosh Operating System. This is both a blessing and a curse: the Unix operating system is incredibly flexible, but only as long as you have the requisite system-administration skills.

All the products are PowerPC native, and all except XTen conform to the current standard version of X (release 5, known as X11R5), with some extensions slated for release 6 added on. Tenon says that its product will be compatible with release 6 when it ships this spring.

MacX and XTen come on CD-ROM, which speeds installation. XTen's functionality requires a lot of disk space, though: more than 50MB for a complete installation, compared with less than 15MB for the other products. XTen also

consumes prodigious amounts of memory, requiring 12MB compared with 4MB for the others.

The programs are all priced within $55 of each other, starting at around $300. This is about $200 less than X server software for Windows, making the Mac products attractive to organizations that must populate a lot of desktops with X capability. None of the products is yet Open Transport native, which means most tasks pay the performance penalties exacted by nonnative MacTCP when they're running on Power Macs. The exception, XTen, uses its own TCP/IP protocol stack in place of either MacTCP or Open Transport. The downside of this approach is that once you've launched XTen, you must keep it open in order to run Mac TCP/IP clients, such as FTP or a Web browser.

Xpedient Operation

We tested the four Mac products and the Windows product using an IBM RS/6000 Unix host, running both X11perf (the industry-standard performance benchmark) and two interactive applications—the Carnegie-Mellon ez word processor and the animated physics simulation xspringies—to evaluate real-world text-scrolling and graphics-animation speed (see the benchmark "How Fast Can the X Files Go?"). The X11perf benchmark provides objective measurements based on speed for individual X drawing operations, while the interactive application tests take a more subjective look at responsiveness and animation smoothness (important in simulation applications).

We avoided using Xmark, another industry benchmark, because it reduces test results to a single numerical rating, which can hide a multitude of performance sins. Better that you get the raw data and decide for yourself whether performance in a particular category will help or hinder your application.

The X11perf benchmark produces a detailed list of performance figures. We grouped these into eight categories: rect-

Window

by Mel Beckman

angles, lines, outlines, curves, area fills, text rendering, bitmap moves, and window manipulation. We ran each test five times, averaging the end results.

In the X11perf benchmark, Tenon's XTen was most consistently the fastest, and NetManage's XoftWare for MacOS was most consistently the slowest. XTen outperformed the other Mac products most handily in drawing lines, filling areas, moving bitmaps, and rendering text. These higher benchmark numbers didn't always translate into significant real-world performance improvements, however. Interactive tests showed little difference in text-scrolling, graphics-drawing, or window-handling speed among the four products. Both XTen and Exodus were noticeably, but not remarkably, faster than the other Mac products. However, when running the xspringies animation program, both XTen and Exodus produced significantly smoother results, with little flicker.

The products also stacked up well against the Windows server, ReflectionX 4.1, although the 32-bit Windows NT TCP/IP stack it used—comparable to Apple's Open Transport—gives the Windows platform an advantage. Still, some tests are a mixed bag—ReflectionX soundly trounced the Mac products when rendering text, but placed third in window manipulation.

Features Xamined

Fast X emulation is of little value if it won't run your application mix, and speed is usually less appreciated in hard-to-use software, so features and ease of use should be high on your list of product considerations. The first features to consider are the extensions required for your environment. Although X is supposedly a platform-independent standard, some widely used capabilities were developed by organizations outside the official X-standards organization. Among these are platform-independent extensions, such as Motif, and proprietary extensions specific to a given vendor's software, such as IBM's AIXWindows. And while the cur-

X Marks the Spot

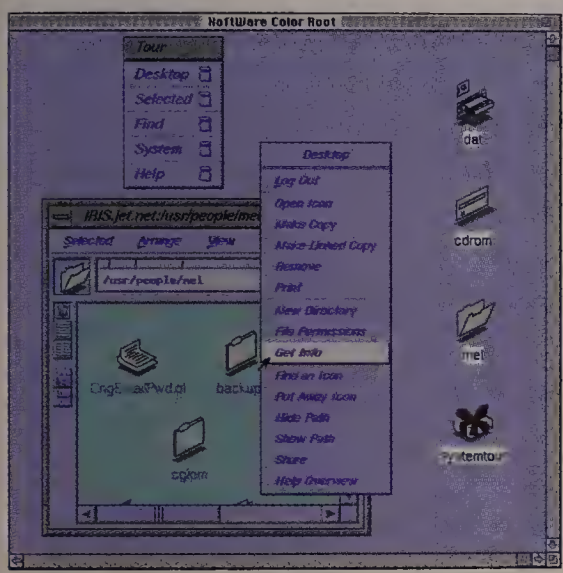
	Apple Computer	NetManage	Tenon Intersystems	White Pine
			Editors' Choice	Editors' Choice
Product	MacX 1.5	XoftWare for Mac OS 3.0	XTen 6.0	Exodus 5.2.1
Star rating*	★★★/6.7	★★★/6.5	★★★★/8.1	★★★★/8.3
List price	$295	$295	$350	$295
Phone	408/996-1010	619/755-3998	805/963-6983	603/886-9050
Pros and cons	Kudos to Apple for setting the price in this category even lower than that of PC-based X server software—but the MacX's performance, while good, is just a shade behind White Pine's.	Taken from Apple's code, XoftWare for Mac OS 3.0 turns in a similarly adequate performance at the same price.	XTen 6.0 is a speed demon, tops in 7 of 8 performance tests. But be sure you're willing to be a Unix guru before choosing it.	All around, the best for price/performance and support of the X protocol—with a new version waiting in the wings.
X release	X11R5	X11R5	X11R6	X11R5
Window managers				
Standard: Motif, Open Look	●	●	●	●
Proprietary: AIXWindows	●	●	●	●
HP-VUE	○	○	○	●
DECWindows	●	●	○	●
Silicon Graphics IRIX	**	**	**	**
Local Mac-style (rootless)	●	●	○	●
Local Unix-style (rooted)	●	●	●	●
Extensions				
XIE	●	●	●	●
XDMCP	●	●	●	●
XLFD	●	●	●	●
Shapes	●	●	●	●
Bézier curves	○	○	○	●
Local clients	○	○	●	○
Multiple monitors	●	●	○	●
Built-in FTP server	○	○	●	●
24-bit color	○	○	●	○
Device-independent color	○	○	●	○
Color-map editor	●	●	○	●
Acceleration modes	●	●	○	●
Client launch via rexec and rsh	●	●	●	●
Client launch via telnet and rlogin	○	○	●	○
ICCCM compliant	●	●	●	●
Unix execution environment	○	○	●	○

*● = yes; ○ = no. * Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) ** Does not support IRIX proprietary DGL features.*

rent release of X is 6 (abbreviated X11R6), most servers only support R5, with selected R6 features added on as extensions.

All the Mac products support the most common standard window managers: Motif and Open Look. You'll need to know which variant of Unix and graphical user interface (GUI) is on the workstation you'll be accessing. Not all the Mac X server packages support other extensions equally well, so take care to determine which you need (see the table, "X Marks the Spot").

The most popular X11R6 extensions are XIE (X Imaging Extensions), XDMCP (X Display Manager Control Protocol), XLFD (X Logical Font Description), Shapes, and Bézier curves. The XIE extension is helpful for image processing and multimedia applications; it supports multiple-image formats, real-time video, and enhanced bitmap performance. If your organization has special security requirements, you may need the XDMCP extension, which controls access via a user-ID/password log-on sequence and host-access control lists. The XLFD extension lets you use the newest X font libraries, including special character sets for languages such as Japanese or Chinese. The Shapes and Bézier curves extensions are sometimes required by X drawing applications, although most can get by without them, at some loss of performance. All the servers support XIE, XDMCP, and XLFD, but only Exodus includes Bézier curves.



Finding Your Roots One advantage of rooted mode is access to Unix desktop icons and pop-up menus, as shown here with White Pine's Exodus serving the Silicon Graphics IRIX desktop. In a rootless environment, these facilities aren't accessible, possibly hindering the operation of Unix applications that require them.

Living Together White Pine's Exodus (as well as Apple's MacX and NetManage's XoftWare for Mac OS) supports rootless mode, which lets Mac and X windows coexist side by side. By default, X windows have standard Macintosh window appearance and controls; Exodus also lets you give X windows a traditional Unix look and feel.

The X Takeover Tenon Intersystems' XTen is a self-contained Unix operating system environment that works only in rooted mode, replacing your entire Macintosh window with a native Unix windowing environment. You can switch easily between X and Mac windowing modes, but unfortunately you can't view them side by side.

Convenience Xplored

After essential features, you'll want to look at convenience. All the products can copy and paste text and graphics between Mac and X applications, use network font servers, convert fonts when necessary, remap the keyboard, emulate or use three-button mice, improve performance by using memory to save window contents, and operate over non-Ethernet serial TCP/IP connections such as PPP or SLIP. All the products can also use remote window managers running on a Unix host, giving applications the same look and feel as if they were running on the host system directly. The remote window manager is contained, or rooted, entirely within a Macintosh window.

Three of the products—MacX, XoftWare for MacOS, and Exodus—offer an alternative window-management technique called *rootless operation*. Each X window appears as a separate Mac window, commingled with all your other Mac windows. This is nice when users aren't X experts and would prefer to work with Mac-style menus and window controls. Unfortunately, not all X controls have Mac equivalents, so some applications are difficult or impossible to use in a rootless environment. For instance, in most rootless environments, pop-up menus on the X desktop are inaccessible.

XTen, a full-fledged Unix system, has the added advantage of being able to locally run two popular Unix window managers, Open Look and Motif. This greatly reduces network traffic because your Mac handles all mouse movement and control manipulation. XTen can also run client applications on the Mac, and comes bundled with a large number of popular Unix clients (see the screen shot "The X Takeover"). And Tenon includes a separate CD chock-full of even more Unix clients—including text editors, file managers, and graphics-manipulation tools—a nice bonus if the applications can replace ones you currently run remotely.

Other features to consider include the ability to use multiple monitors, the ability to create custom color maps when Unix color schemes clash with Mac standards, and 24-bit color and device-independent color for prepress image processing. No one product had all of these features. All except XTen offer multiple monitors and color-map editing, while only XTen supports 24-bit and device-independent color.

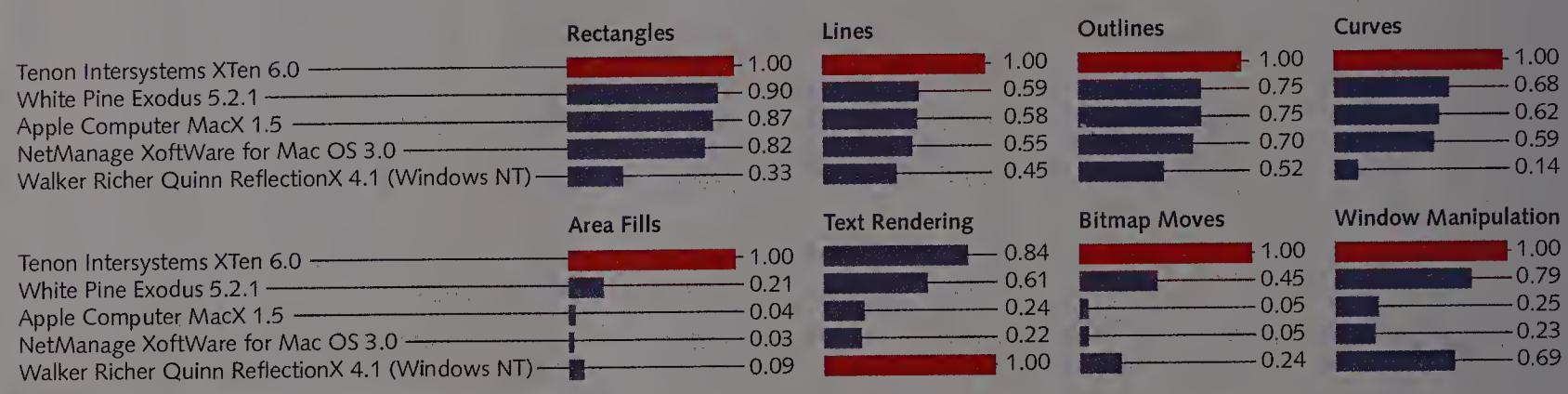
Xpecting Usability

Configuring and administering X on Unix platforms is painful, requiring the editing of cryptic text files, a tedious and error-prone process. All of the Mac products simplify this chore via point-and-click setup and operation, making the X server software applications as easy to use

How Fast Can the X Files Go?

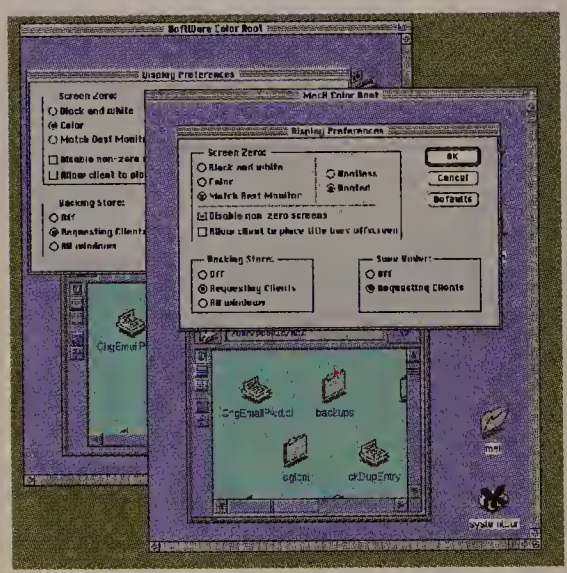
Best result in test. Longer bars are better. Products are listed in overall order of performance.

What the Mac OS user interface is to Macintoshes, the X Window user interface is to Unix workstations. Because of that common graphics bent, we ran performance tests to determine how well the X Window server software handled bitmaps, fills, and other graphics-related activities. While the Mac products generally beat out the Windows NT software from Walker Richer Quinn, the full-fledged Unix-in-Mac software from Tenon Intersystems surpassed all of the others.



BEHIND OUR TESTS

We tested the Macintosh X Window server software running on a Power Mac 8100/100 accessing an IBM RS/6000 Model 250. The Windows NT machine was a Gateway 75MHz Pentium PC. We used the industry-standard X11perf benchmark, which produces a detailed list of performance figures based on number of operations per second. We ran each test five times, averaging the results to obtain overall totals for each category. We gave the top performers a score of 1.0 and indexed the other products against that score.—**Macworld Lab testing supervised by Mel Beckman and Lauren Black**



Separated at Birth? Apple's MacX and NetManage's XoftWare for Mac OS are virtually identical—right down to the content and arrangement of dialog boxes—due to their common heritage in Apple's original MacX product. The only detectable difference between the programs is a slight performance edge in Apple's MacX.

as other Mac network applications, like terminal emulators. MacX, XoftWare for Mac OS, and Exodus also let you create custom menu options to launch remote clients automatically using the standard Unix services *rexec* (remote execute) and *rsh* (remote shell). XTen doesn't support customizable menus but does offer two additional client-launching facilities, *telnet* (terminal emulation) and *rlogin* (remote log-in), which let it work with a wider variety of host configurations.

XTen takes a novel approach to point-and-click configuration. Because its Unix environment is primarily textual, you can either edit text files to configure XTen, in the traditional Unix fashion, or you can run the supplied Mosaic Web browser, which interacts with a Web server embedded in XTen to let you configure the product through Web pages. While ingenious, this technique is neither as simple nor as foolproof as a genuine Mac GUI configuration interface. Unless you're familiar with Unix, you'll find the other products much easier to set up and use.

The Last Word

Based on feature set, ease of use, and speed, Exodus edges out the other products to share the Editors' Choice with XTen. The three non-Unix servers are about equally easy to use, but Exodus has a wider range of window-manager and extension support, as well as significantly smoother animation. You may not be able to predict what extensions you're likely to need in the future, so choosing a product with a broad set of extensions and good performance is a can't-lose proposition.

XTen, while faster than Exodus, lacks its ease of use and feature set. But if you're an experienced X administrator and can take advantage of the local clients and window managers supported by XTen, you might be better served by XTen's unique full-Unix X environment.

Whatever your choice, you can look forward to improved performance when new X server versions ship with native Open Transport support, in 1996, according to the vendors. The vendors promise full X11R6 support as well. That makes for an excellent future. **m**

MEL BECKMAN (*mel@becknet.com*), a consulting network engineer and frequent contributor to *Macworld* on networking and Internet subjects, supports dedicated, Mac-based and PC-based X servers as well as Unix host systems.

X SERVER SOFTWARE

MW EDITORS' CHOICE

Features and ease of use carry the most weight in X server value, but speed is never frowned upon.

★★★★/8.3 **Exodus 5.2.1** With an extensive feature set, a wide range of usability and connectivity features, and swift performance too, Exodus is most likely to meet your X server expectations. **Company:** White Pine. **List price:** $295.

★★★★/8.1 **XTen 6.0** If you're an old hand at X and want all the capabilities of a Unix workstation on your Mac desktop, XTen is for you. The use of local client applications and a local Unix window manager eliminates a lot of network traffic, reducing the effects of the TCP/IP bottleneck. **Company:** Tenon intersystems. **List price:** $350.

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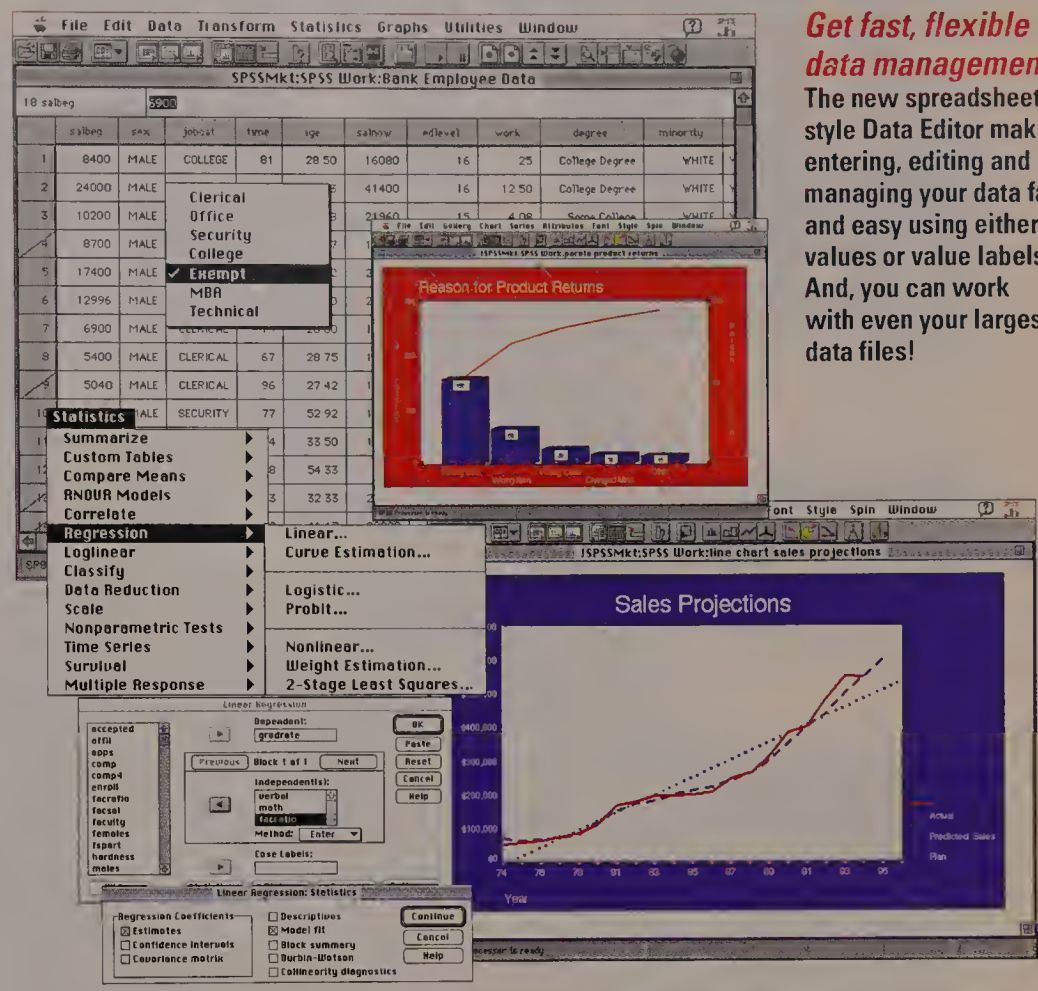

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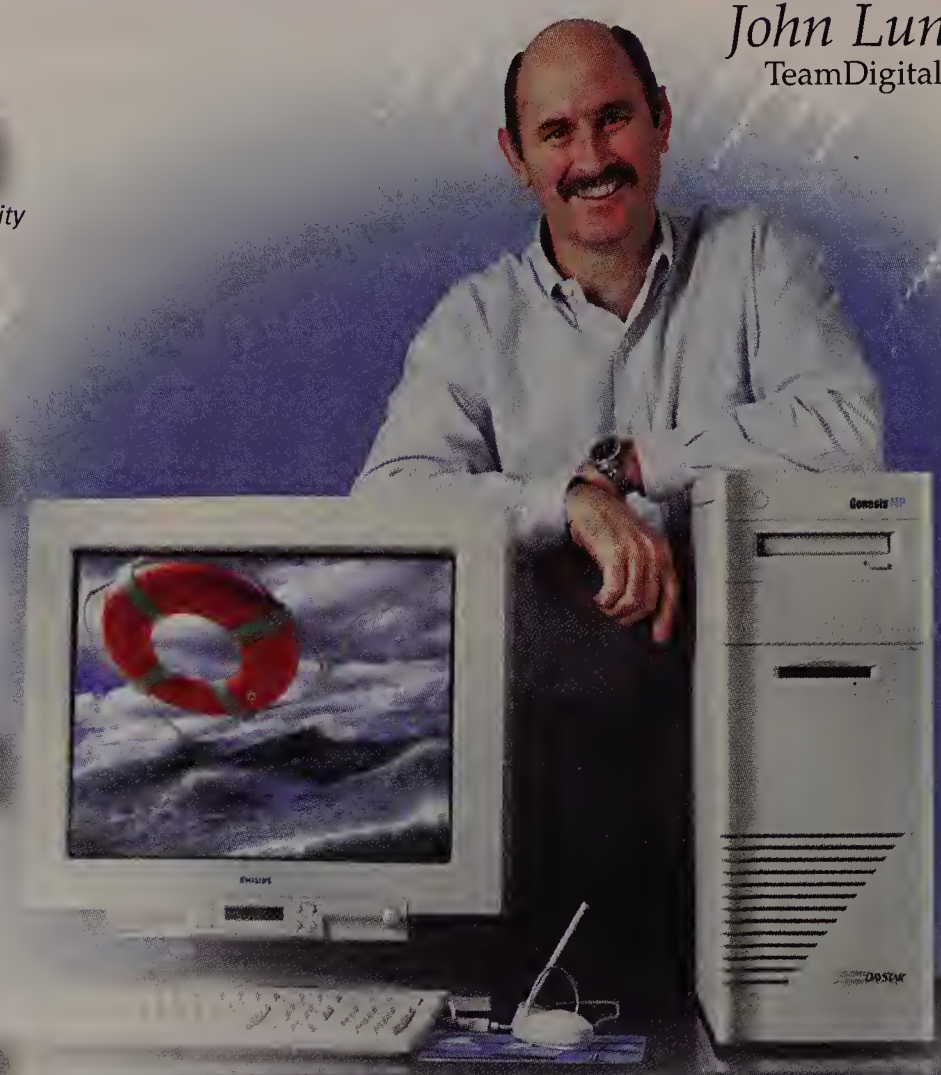

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Secrets

Mysteries of a Temporary Nature

MEET AN INVISIBLE, UNMOVABLE FOLDER THAT YOU USE EVERY DAY

by Joseph Schorr

Did you know there's one folder name—and only one—that's absolutely forbidden on a Macintosh? No matter where you create a folder—on the desktop, on the root level of your hard drive, in a deeply nested subfolder—you can't name it Temporary Items. System 7 reserves that name for use by the system software. Try using it, and a dialog box tells you so and asks you to choose another name. (Some programs break Apple's rules and add their own Temporary Items folder inside the Preferences folder; this is a normal, visible folder, and it's not a standard part of the operating system.)

You don't hear much about this elusive little part of the Mac OS, but the Temporary Items folder deserves some attention. It plays a significant role in your work, and depending on which version of System 7 you're running, you can interact with it in surprising ways.

So what is it? The Temporary Items folder is a locked, invisible folder that lives permanently at the root level of your hard drive. Applications can use this hidden folder for any purpose; generally, programmers instruct applications to store scratch files or other temporary data there—stuff users are not supposed to interact with directly. QuarkXPress, for example, drops an XPress Temp file in this folder whenever you have a Quark document open. Microsoft Word also uses this folder as a temporary dumping ground. Word 5 called these files WordTemp-1, WordTemp-2, and so on. Word 6 also places temp files in the Temporary Items folder, but gives them bizarre names such as dftmpAIBDBENKkkkkk. (One theory says the name is the sound Word 6 users make on first encountering the program's bloated, sluggish Windows-oriented interface.)

A Mystery Explained

Here's one example of how the Temporary Items folder affects your life. Ever wonder about the strange Rescued Items folder that periodically appears in the Trash? Usually this folder shows up when you restart your Mac after a crash or freeze. What's it doing there? It contains all the files that were in the Temporary Items folder when you crashed.

You see, the Temporary Items folder, as its name implies, is only a temporary holding bin for files. When you finish working with a program and use the Quit command, the program is supposed to purge from the Temporary Items folder any temp files it had created. But if a pro-

gram quits unexpectedly or your system crashes, the program never gets a chance to empty the Temporary Items folder. So, when you restart and your Mac notices that you still have files left over in the Temporary Items folder, the Mac automatically creates a new Rescued Items folder in the Trash and moves the files there; it's the Mac's last-ditch effort to salvage your unsaved work. Every now and then, you can actually recover some of your work by poking into the rescued temp files.

Tracking It Down

Want to catch a glimpse of the Temporary Items folder? You can, simply by using the Find File command and searching for it by name. It'll show up in the Items Found window. (Oddly enough, it won't show up if you search for invisible folders, as described in "Look, Don't Touch.") You'll be able to see the folder, but the system restricts you from opening it up. Actually, System 7.5 keeps you fairly protected from the Temporary Items folder; it almost never appears, but there are exceptions. If you use Now Utilities, for example, the Temporary Items folder shows up on the Drive menu, and when you use Now FolderMenus, just as if it were any other folder. The hierarchical menus even reveal the contents of the invisible folder.

If you're still using System 7.0 or 7.1, the Temporary Items folder is easy to find—too easy, in fact; it shows up in most Open and Save dialog boxes, just like any other folder. And this can get you into serious trouble. Consider this true story. A professional graphic designer was working in Adobe Illustrator. When he was done with the file he was creating, he hit Save, named the file, and looked for a place to store it. While in the Save dialog box, he noticed the Temporary Items folder on his hard drive. Not realizing this was an invisible folder—and not one he had created—he thought, "I'm only going to need this file for about a week, so I'll put it in this Temporary Items folder." Sure enough, when he went to retrieve the file later that day, he couldn't find it; it was still in the Temporary Items folder, but it was completely invisible in the Finder. He frantically opened and closed folder after folder, trying to track down the Temporary Items folder. He was just about convinced that he was the victim of an insidious file-eating virus, when he figured out what had happened. He was able to rescue his work—by relaunching Illustrator and using the Open command, which once again revealed the otherwise invisible Temporary Items folder.

Had he restarted his Mac, of course, the file would have ended up in the Trash, in the Rescued Items folder. You have to wonder how many files have inexplicably disappeared over the years as a result of users' innocently placing files in the Temporary Items folder, unaware that they might never see them again. That's why it pays to know what all those perplexing little components of the Mac OS are really about—even the ones you can't see. m

Contributing editor JOSEPH SCHORR is coauthor of *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide, 1996).

LOOK, DON'T TOUCH

The Temporary Items folder is just one of System 7's many invisible files. The fact is, your Mac is teeming with hidden files and folders that function behind the scenes—and that aren't meant to be tampered with.

There's the Desktop DF file, for example—the Mac's internal database that keeps track of what files you've got and their icons (it's the file that gets rebuilt when you rebuild the desktop). Move&Rename is another invisible folder that appears on networked Macs to handle file movement and renaming when File Sharing is turned on. In System 7.5, there's also a hidden file called Shutdown Check; it's the file that determines whether your Macintosh will tell you that the computer was shut down improperly when you restart after a crash. And every time you apply a custom icon to a file, you add another invisible file called Icon, which stores the custom icon information.

You can see most of these files by searching for invisible files using the Find File command. (To get visibility as a search criterion, hold down the option key while using the first pop-up search criteria menu in Find File.) They also show up when you use file utilities such as ResEdit or DiskTop, and sometimes in Open and Save dialog boxes.

Temporary Items to the Rescue?

When a program crashes, it sometimes leaves behind temp files in the Temporary Items folder. When you restart your Mac, those files end up in the Trash in a folder called Rescued Items From. If you lose unsaved data in the crash, there's a chance—a slim one—that some snippets of your work may be in those temp files. So how exactly do you recover them?

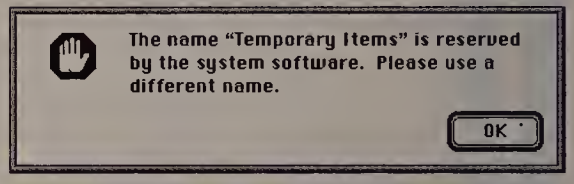
1. Open the Rescued Items folder and drag any files you find to the desktop.

2. Launch a program that is appropriate for opening the recovered data. For example, if you're trying to recover text, a word processor such as Microsoft Word works best, because it can open most kinds of files.

3. Use the program's Open command to open each of the recovered temp files. (Double-clicking on the icons of the recovered files won't work.) If you're using a program like Word or WordPerfect, make sure you use the All Files option from the file-type pop-up menu, so you can open files that aren't native to the program.

4. If you manage to open one of the recovered files, poke around in it to find recoverable data. Some files may contain a lot of garbage characters, but among the gibberish may be a few strings of precious text that you can recover by copying them into a new document.

TO BE FAIR, THIS TRICK ALMOST NEVER WORKS. BUT SOMETIMES IT DOES—AND IF YOU'RE DESPERATE TO RECOVER LOST WORK, IT'S WORTH A TRY.



Reserved and Restricted Under System 7, you can't name a folder Temporary Items—anywhere.

Quick Tips

Tips, Tricks, and Shortcuts

by Lon Poole

Installer programs simplify the process of updating or installing software, but too many rudely scatter files all over the System Folder without so much as a by-your-leave. Some installers even commit the unforgivable offense of overwriting your existing control panels and extensions with *older* versions. Although you may be able to limit this subterranean mischief by doing a custom installation, Bonnie Davis Kofsky of Benicia, California, has a method for keeping tabs on the changes. Before running an installer program, label every System Folder file you want to keep track of, using the Label control panel; then restart. Next, back up your hard drive and run the installer. If the installer forces you to restart the computer but you don't want new extensions loaded until you see what they are, disable extensions (by holding down the shift key during the restart). To spot new items in the System Folder, look for files that bear no label. You can automate the search with System 7.5.1's Find File feature. Select the System Folder and choose Find File from the Apple menu. Set it to search for any item in the Find selection whose label is none. When Find File displays its list of found items, you can select all, copy it, and paste the list into the Scrapbook or any text document for later reference. You can also select any number of found items quickly and change the label using Find File's Open Enclosing Folder (⌘-E).

At best, labeling system files can help you reduce System Folder clutter and save RAM and hard drive space. At the very least, you know exactly which files the installer added. All else being equal, knowledge is always better than ignorance.

Hearing Waves

Q What do I need to do to use sound files downloaded from the Net that are in a .wav format?

BRETT HASTINGS
Gainesville, Florida

A Several utility programs can play sound files whose names end with .wav (designating a sound in the Windows Wave format). If you have QuickTime 2.1 and Sound Manager 3.1 installed (they're included with System 7.5 Update 2.0), you can play Wave sound files with SimpleText 1.3 (set SimpleText's preferred size to 1000 in its Get Info window) or with Apple's free Movie Player 2.1.

Other programs that play and convert Wave sound files include Norman Franke's free SoundApp 1.51 and EJ Campbell's $10 shareware Ultra Recorder 2.2.1. SoundApp plays more than a dozen sound formats besides Wave (and converts them to Mac formats), and you can use it with Netscape Navigator 1.1 and 2.0 and NCSA's Mosaic to play Web sounds. Ultra Recorder, as its name suggests, lets you record sounds from a microphone or audio CD, as well as play and convert sound files. Both programs are available from Macworld Online at *http://www.macworld.com* and America Online (keyword *Macworld*).

Enhanced Quit

Q I've written an AppleScript script that moves uncommonly used fonts out of the Fonts folder after I'm done with an application that uses them. Is there any way to have the script run automatically when an application quits?

DAN FRUMKIN
Richmond, Virginia

A The following short script tells a scriptable application to quit and then calls your font-moving script as a subroutine (not shown):

```
tell application "QuarkXPress®"
    activate
    quit
end tell
--call your subroutine here
```

This script doesn't quite do what you want because it doesn't run automatically when you choose Quit from the application's File menu. You have to run the script by some other means. For example, if you have saved the script as an application in the Automated Tasks folder, you would choose the script from the Apple menu.

A few applications do let you attach scripts to objects in the applications. For instance, Claris's FileMaker Pro 2.1 and later versions let you run a script by simply clicking a button or choosing the script from the Scripts menu. You actual-

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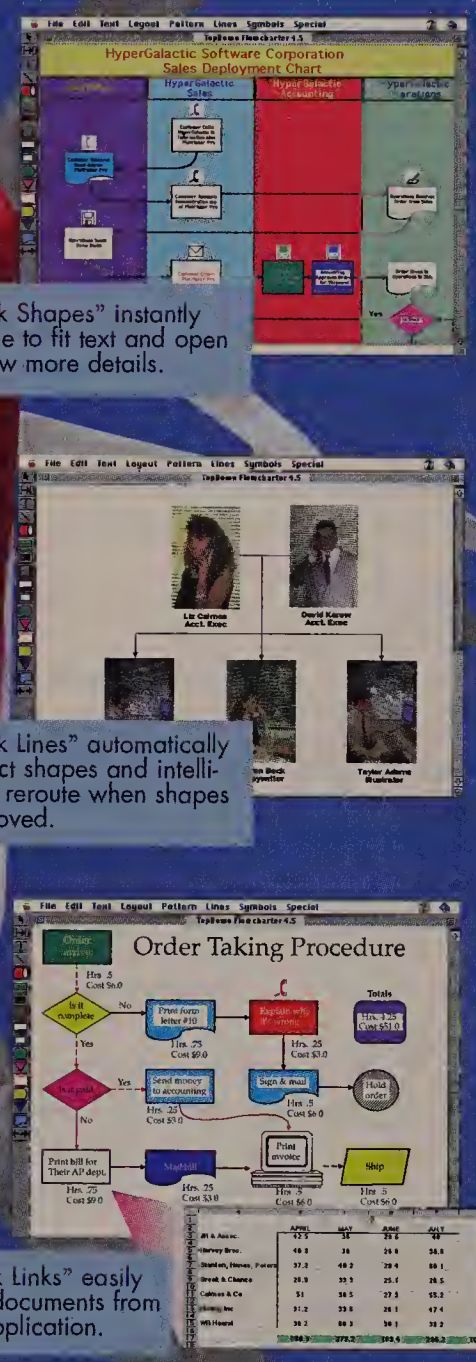

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ly are running a FileMaker Pro script, but that in turn can run an AppleScript script. To set up that chain of events you first use an AppleScript editor program such as Scripter from Main Event Software (202/298-9595; see *Reviews*, March 1996), Script Debugger from Late Night Software (604/929-5578; reviewed November 1995), or Apple's Script Editor to create a script that quits FileMaker Pro and moves the fonts. Then you save that script as a script application—call it, say, Quit & Move Fonts. Here's an example of an AppleScript script that quits an application and then runs another script to move fonts.

```
tell application "FileMaker Pro"
    activate
    Quit
end tell
run script file "Move Fonts"
```

continues

Placing Graphics in SimpleText

How do people get graphics into a Read Me file or other SimpleText document, and how do they give it the special newspaper-style icon that designates a read-only SimpleText document? As you may know, the obvious methods—pasting graphics into the text and locking the file with the Finder's Get Info command—don't work. You need a secret keystroke and a resource editor such as Apple's ResEdit, says John Papazian of Littleton, Colorado. Here is the procedure.

1. Open the SimpleText document you want to enrich with graphics. Wherever you want to insert a graphic, place the insertion point and type option-spacebar (the secret keystroke), followed by several blank lines to leave space for the graphic. The number of lines isn't critical; you can adjust it later.

2. Paste the graphics into the Scrapbook.

3. Use ResEdit to open a copy of the SimpleText document. If ResEdit tells you that opening the document will add a resource fork (where SimpleText stores graphics) and asks if you want to do that, answer OK. If ResEdit doesn't ask about adding a resource fork, then the document already has one.

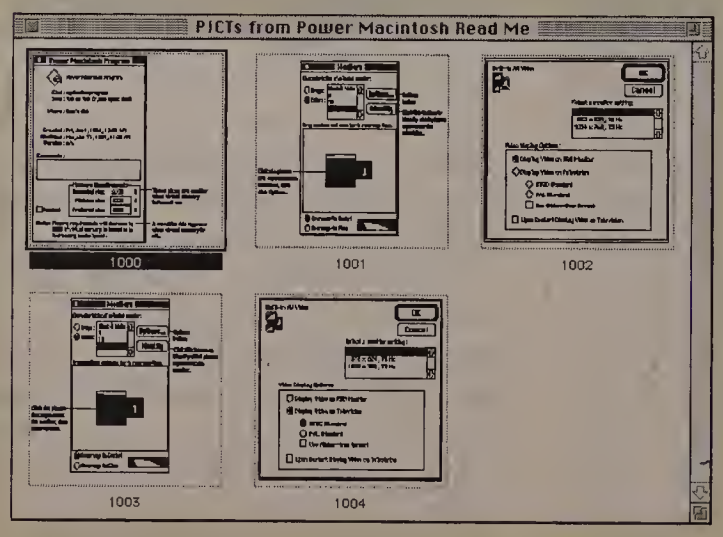
4. One by one, in the order of their intended appearance, copy each graphic from the Scrapbook and paste it into the SimpleText document's ResEdit window. When you paste the first graphic, a PICT resources icon appears in the window.

5. Open the PICT resources to see the individual PICT graphics you pasted. Select each graphic and choose Get Resource Info from ResEdit's Resource menu (or press ⌘-I). In the resource info window that appears, change the ID number. Make the ID number 1000 for the graphic you want placed first, 1001 for the graphic to be placed second, and so on.

6. Close all the ResEdit windows, saving changes when asked.

7. Open the edited document file using SimpleText. You should see a graphic in each place you inserted an option-space. The graphics are always centered in the document window. If a graphic overlaps text, simply add blank lines for additional space. Sometimes graphics seem to vanish after you add or remove a line; to display the images, scroll the document or use the WindowShade control panel to refresh the screen.

8. To make a document read-only, close it and use ResEdit's Get File/Folder Info command to change the document type to ttro.



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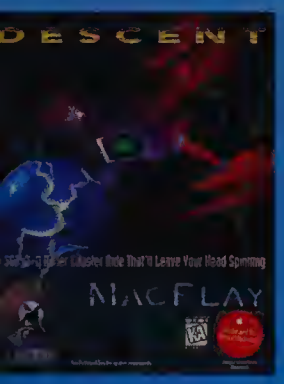

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Next, in FileMaker you choose ScriptMaker from the Scripts menu and create a FileMaker Pro script. In this script you need to include a Send Apple Event step that sends the Open Application event to Quit & Move Fonts (the script application you already saved). You can add the FileMaker Pro script to the Scripts menu or attach it to a button. You can control the whole chain of events within FileMaker, although not by choosing Quit from FileMaker's File menu.

HyperCard 2.3 lets you more fully integrate AppleScripts. Anywhere you can use a HyperTalk script, you can use an AppleScript script instead. It can handle most of the same messages as a HyperTalk script, although the syntax may be a little different. The following AppleScript script handles the message that HyperCard sends to the last stack it closes after you choose the Quit HyperCard command (or press ⌘-Q):

```
on quitApplication
    run script file "Move Fonts"
end quitApplication
```

Notice that this script does not explicitly tell HyperCard to quit. HyperCard quits automatically at the conclusion of a script that handles the quitApplication message.

Timeless

TIP Sometimes when you're on a deadline, the last thing you want to know is the date and time. Instead of going to the Date & Time control panel to shut off the menu-bar clock, option-click the clock and it disappears. It reappears if you option-click the space again.

JARED HUNTER
Medford, Massachusetts

Rename without Pause

TIP If you hate that pause between clicking a Finder icon's name and being able to edit it, quickly move the mouse pointer just outside the name after you click it. This maneuver instantly selects the text for editing.

ADAM SLIM
North Vancouver, British Columbia, Canada

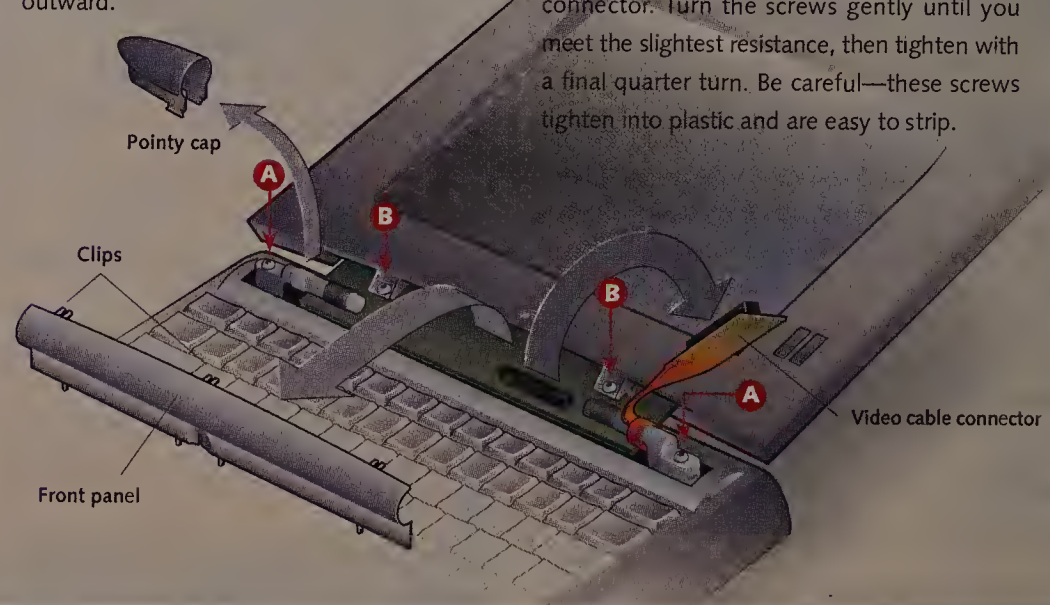
Another way to beat the wait is to click the icon name (or click the icon and press return to select the name) and then move the insertion point by pressing an arrow key. Pressing the up-arrow (↑) key moves the insertion point to the beginning of the name, and the down-arrow (↓) key moves it to the end.—L.P.

Concealed Screws

- Four screws on a 500-series PowerBook may need occasional tightening.
- Remember to remove your PowerBook's batteries before you begin.
- All these screws take a T8 Torx screwdriver, available from most hardware stores.

Two screws attach to the magnesium frame **(A)**. To get at them, take off the pointy caps underneath the screen. There is a real knack to it: squeeze hard at the base of the caps and pull outward.

To find the other two screws **(B)**, carefully pop off the display housing's front panel (note the clips' location—they're easily broken). For one screw, you'll need to pry up the video cable connector. Turn the screws gently until you meet the slightest resistance, then tighten with a final quarter turn. Be careful—these screws tighten into plastic and are easy to strip.



Loose Screws Plague PowerBooks

The screen on the 500-series PowerBooks is held on by four screws that can work loose and cause a plastic post inside the screen housing to snap off, but fortunately the repair is not as expensive as I reported in February's *Quick Tips*. Apple's customer-service center (800/767-2775) told a *Macworld* editor whose PowerBook 540c broke that he would have to pay $1300 to replace the entire screen assembly, but Macadam, a San Francisco Apple dealer, fixed the problem for $120 plus labor by replacing just the plastic screen housing. David Lerner has serviced many PowerBook 500's at Tekserve in New York City and says it replaces the housing (part number 076-0464) for about $114 plus labor. If the problem is the magnesium frame that the display hinges screw into, Tekserve in New York City replaces that part (number 922-0910) for $34 plus labor.

You may want to forestall even those modest repairs by tightening the troublesome screws, but finding them isn't easy. "Concealed Screws" shows where they are. To keep the screws from coming loose, Matt James of Murfreesboro, Tennessee, suggests you take a trip to your local hobby shop for some thread-locking compound, used on radio-controlled cars to prevent their screws from vibrating loose. Apply the compound to the threads of the screws, and the screws should keep tight yet still be removable if needed. Alternatively, Chung-Pang Lai of Milpitas, California, suggests wrapping a tiny piece of plumber's Teflon tape (available at hardware stores) around the threads of each screw before replacing them. Warning: Traces of tape or thread-locking compound could be used as evidence to void your warranty. m

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LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).

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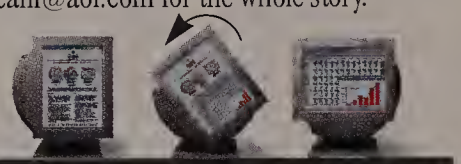

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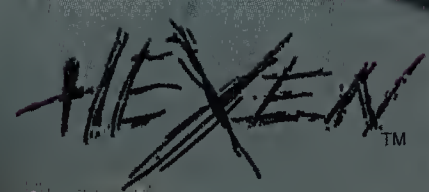

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Seek and Ye Shall Find: Searching the Web

by Matthew Hawn

Connect a few million computers to each other, and you face a data-management problem of epic proportions. That's why the most important tools currently in use on the Web are those that help you find what you're looking for. Most of these search tools (and there are a lot of them) are free of charge, so you can load up your bookmarks with as many as you like. But it's worth your while to take a few minutes to understand how the different engines work. That way you can choose the right one each time you set out to search the Web.

Spiders, Worms, and Other Creepy Crawlers

Like many Internet innovations, Web search engines were hatched at universities in the early 1990s. A few computer scientists figured out that if there wasn't a way to index the information that had begun pouring onto the Web, things were bound to get out of control fast. Taking a cue from the structure of Archie and Gopher servers, which track and index software and text on the Internet for FTP and Gopher clients, these programmers wrote software that crawls all over the Web unattended (and most often in the wee hours of the morning), collecting data and then automatically applying algorithms to sort that data into keyword-searchable indexes.

You've heard a lot about artificial intelligence? Well, let's just say that it's a relative term when it comes to Web indexers. These programs, sometimes called Web robots or spiders, are best at achieving volume, not subtlety—

they tend to return a huge volume of URLs for you to browse. Using keywords that you enter, an indexing spider's algorithms will return URLs tagged according to their probable relevance. The method for gauging relevance is based on a variety of factors, but most algorithms check to see how many times your keywords appear in the document and how close they are to the top of the document.

Most indexes let you make your search more precise by adding Boolean syntax to your keywords; so if you entered the string *X-Files and UFOs*, you'd get the URLs for documents that contained both words. Likewise, if you entered *music not country*, the search would reject documents that contained both *country* and *music* while passing along other documents that contained *music*.

Examples of this sort of Web-search tool are AOL's WebCrawler (*http://webcrawler.com/*) and Digital's Alta Vista (*http://www.altavista.digital.com/*). At press time, Alta Vista was outperforming WebCrawler in terms of speed; it also has a larger index and includes an option to search through an index of posts to Usenet newsgroups.

To convey an idea of the scale of an index-style search, I queried Alta Vista about my favorite songwriter, punk's answer to Buddy Holly, Elvis Costello. Because I gave Alta Vista two words to search on, it searched its index for both words and found 16,639 documents containing "Costello" and 57,821 containing "Elvis." It filtered them down to a list that contained both words and then ranked them according to relevance, displaying the top 200 in about a second. That's still a lot of pages to browse, which brings us to another kind of search tool.

Directories

When it comes right down to it, the human brain is a more discerning indexing tool than any computer. It can make subtle connections that a mathematical rule can't possibly make. For instance, a computer algorithm might view two wealthy white men in their fifties with backgrounds in economics as a pretty close match. You, on the other hand, might perceive that former presidential hopeful Senator Phil Gramm and geriatric rocker Mick Jag-

continues

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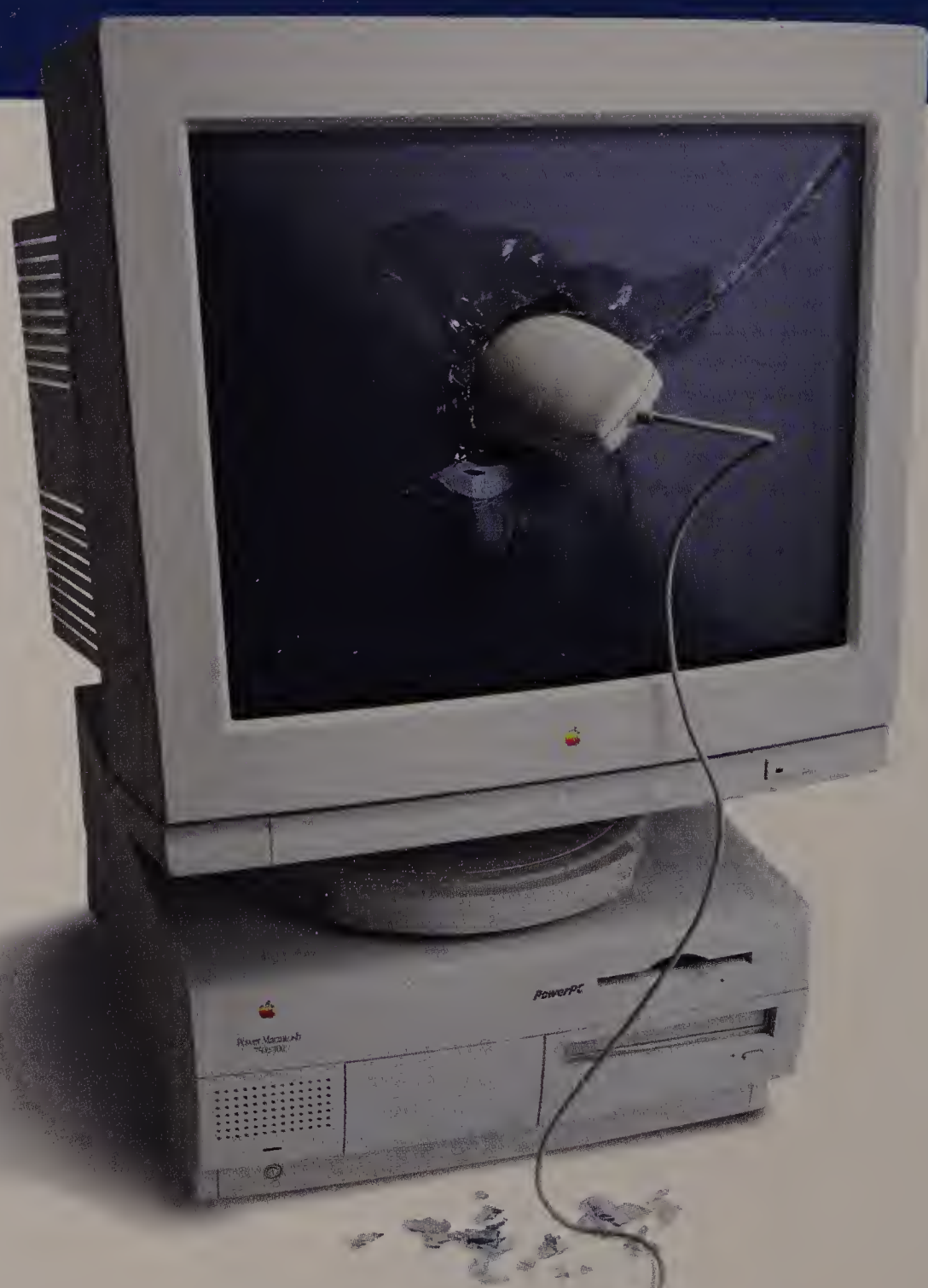

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ger aren't quite so well paired. Hence the Web directories.

Web directories aren't as exhaustive as Web indexes, but they're not meant to be. Instead, directories are collections of URLs that human editors organize and categorize, aided by software. They don't include all Web pages, but instead attempt to separate the wheat from the chaff. The largest Web indexes claim to have crawled more than 10 million pages, while the directories aim at categorizing complete Web sites, not just pages. Personality and voice is what these directories offer. Search on *Star Trek*, and you'll get back an annotated list of URLs for the resources the directory has scanned, breaking them down further by category. While the categories and selectiveness may help you focus your research, bear in mind that the addition of editorial voice is subjective and is useful only if the source is trustworthy, thorough, and up-to-date. Remember, directories are supported by advertising; that's why users get free access. That means it's even more important to be conscious of editorial integrity.

To give you an idea how directory searches work, I queried Yahoo (*http://www.yahoo.com*) about Elvis Costello. Yahoo returned six sites that contained information on him in just a few seconds. Four of these were comprehensive Elvis Costello sites with biographical information, his discography, tour dates, and links to other resources containing lyrics, photos, and reviews. Those are pretty good results, but two of the six links were dead or outdated; keeping these directories current is a daunting but important task. Good directories run regular checks for broken or outdated links.

The index search on Elvis Costello didn't put any of the sites mentioned in the Yahoo directory in its top 200, but it did turn up a wider variety of magazine articles on the Web as well as some other more obscure but interesting

continues

Web Worthy

One of the best things about getting your Mac online is the availability of freeware and shareware via modem. While America Online and the other commercial services provide shareware as part of their monthly fee, you can get the same software on the Web without extra charges.

There are dozens of Macintosh shareware archives on the Net, but combing through them is tedious. To help you outfit your Mac with the latest shareware, Macworld Online created a software library (*http://www.macworld.com/software/*). Think of it as the Yahoo directory for shareware; *Macworld* editors have organized and described the best Mac shareware in useful categories and made downloading as easy as point and click. Come browse awhile.

For a less browsable but more inclusive index of shareware, try the Virtual Software Library (*http://www.shareware.com*), an index of Mac and PC shareware archives worldwide. It lists what's new and what's popular online, and it's a nice resource for hard-to-find shareware.

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Shareware PICKS

Internet Config, by Peter Lewis and Quinn, is a free utility that links preferences for your Internet applications. Most of the important Internet clients for the Mac support Internet Config.

With Internet Config installed, you can change your preferences for Usenet news, your E-mail account, mail host, FTP servers, even your download folder. So when any of your online information changes, you make the change just once in Internet Config.

If you pay an hourly rate for Internet access, try **Wabbit** from Mel Patrick. Wabbit uses a timer and alarm to keep you from staying online too long. It keeps track of your monthly usage and warns you when you exceed your allotted free-service hours.

Wabbit also serves as a mini address book of useful Net sites, though it's not particularly robust. Using the Mac's cut-and-paste tools, you store URLs and information about the sites in a small, searchable database. Best of all, Wabbit is freeware.

You can get these applications and other Mac shareware in the Macworld Online Software Library on AOL or on our Web site (*http://www.macworld.com/software/*).—M.H.

pages that mentioned Costello. What does that mean? When you are looking for a specific topic, the directories provide a cultivated resource for getting information fast. The indexes' wider net takes longer to sort through, but it might return some wonderfully strange items.

While Yahoo is the most famous and still probably the most useful directory, it faces some challengers. Two of the larger Web indexes, Infoseek (*http://guide.infoseek.com*) and Lycos (*http://www.lycos.com*), are adding daily news and Web-site reviews to their services in an attempt to draw more visitors and thus attract advertisers.

You Can't Always Net What You Want

None of these search tools is perfect—and thank the gods of cyberspace for that. Digital free association is what the Web is all about, and those chance occurrences when you stumble onto something fascinating, but only tangential to what you were looking for originally, are one of the great joys of the Net. To paraphrase a certain geriatric rocker, you can't always get what you want on the Net, but you just might find you get what you need. ■

MATTHEW HAWN (*matthew@www.macworld.com*) can't wait for a personal software agent that will write for *Macworld* while he's in Paris.

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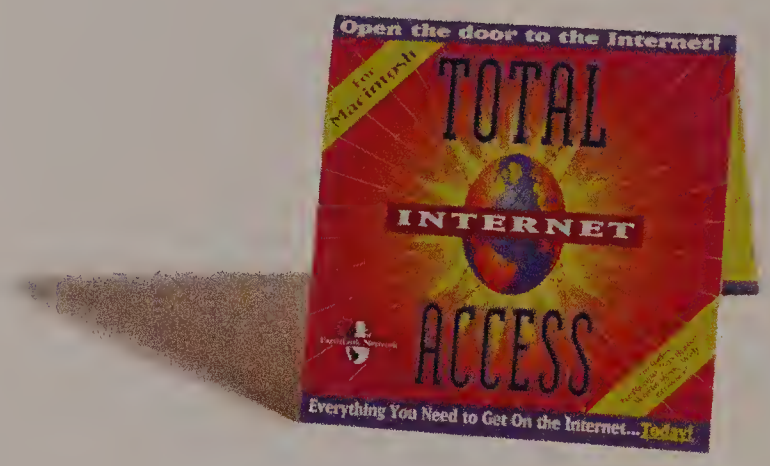

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Media

Optimizing Web and CD-ROM Graphics

SLIM GRAPHICS FOR FASTER PERFORMANCE

by Jim Heid

The Bandwidth Conservation Society wants you to slim down. This loose-knit group of Web developers agree on little except the need to keep World Wide Web graphics as small as possible—to use less server space and processor time, to minimize traffic on an increasingly crowded Internet, and most important, to deliver faster performance to Web surfers. This noble goal also applies to CD-ROM development. Compact CD-ROM graphics use a CD's capacity more efficiently and give you a title that runs faster.

By small, I don't mean matchbook-size graphics, but rather ones whose resolution and color depth have been reduced to occupy the least possible disk space while preserving image quality. It's that pesky size-versus-quality balancing act that the past two installments of *Media* have explored from a video and audio perspective.

You can employ a variety of techniques, tools, and file formats to optimize graphics so they look their best while using the least amount of bandwidth. Find sample images and links to relevant information sources on my Web site (*http://www.mcn.org/heidsite*).

Fewer Bits Buy Better Performance

It would be wonderful to create a CD-ROM or Web site filled with full-screen 24-bit color images, but these images devour storage space. Each 640-by-480-pixel, 24-bit color image requires 900K of disk space—enough to bog down a CD-ROM title and choke most modems.

What's more, many Macs and most Windows machines can display only 256 colors simultaneously. View your gorgeous 24-bit images on a 256-color machine, and their subtle color shifts turn into jarring bands and speckles.

One key to obtaining optimal performance and image quality within the 256-color constraint is to reduce the bit depth of graphics (see "Steps to Smaller Graphics"). By carefully reducing the image's quality you can minimize the damage. Call it controlled degradation.

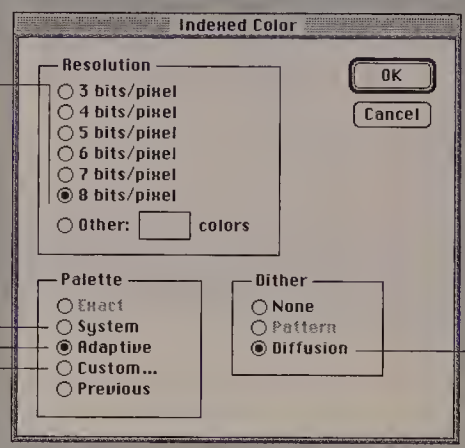
CD-ROM and Web-site developers generally supply graphics in 8-bit form. An 8-bit (256-color) graphic takes a third of the storage space its 24-bit counterpart takes, and accordingly, loads much faster. In fact, with simple images—icons or line art that don't contain a broad

Original 24-bit, 72-dpi RGB image. PICT file size: 92K

Steps to Smaller Graphics

WHEN YOU DISPLAY A FULL-COLOR IMAGE ON A 256-COLOR COMPUTER, THE COMPUTER must simulate colors it can't actually display. It does so by *dithering*, combining pixels in patterns to approximate other hues. To do this, the computer chooses hues from a data table. This color palette or color lookup table is a digital version of a paint store's color-mixing chart: it contains a series of 256 entries, each with a corresponding formula for a specific color. Manipulating color palettes to provide the best image quality on 8-bit displays is a vital stage in the production process. It also contributes to self-induced baldness among media producers.

Bit depths as low as 4 bits per pixel can deliver good results with simple images such as line art but are unsatisfactory for photographs. For photographs, 8 bits per pixel is the best choice, although some images can get by with 7 bits per pixel.



Diffusion dithering usually provides the most pleasing appearance for low-bit-depth images. Unfortunately, it also produces larger GIF files, since GIF's compression scheme is most efficient with areas of solid colors, which dithering by definition removes.

A.

B.

Choosing the Custom option displays a dialog box that lets you manually create a color palette.

Reducing Bit Depths To reduce an image's bit depth in Adobe Photoshop, choose Indexed Color from the Mode menu. In the Indexed Color dialog box, choose the appropriate options.

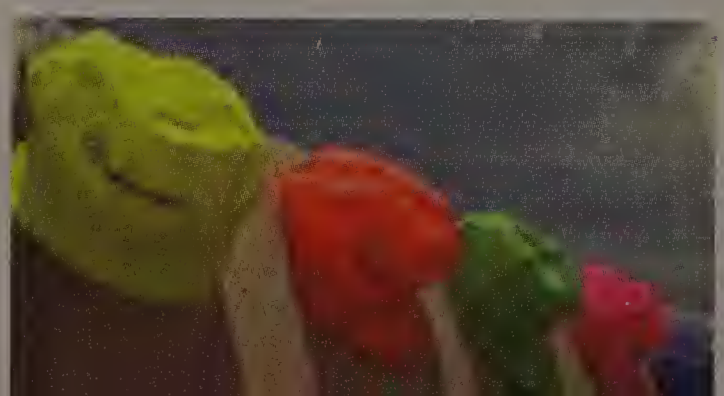
A. The standard system palette contains a wide range of hues, many of which a given image may not require. Similarly, the system palette may lack hues that the image does require. The result is excessive dithering and a speckled look (note the clouds and the hat visors). Unfortunately, the system palette is the best choice for Web graphics (see "Additional Issues").

GIF file size: 18K

B. When you choose the Adaptive option, Photoshop creates a palette tuned to the hues present in the image. The result is less dithering and a more pleasing image. Alas, Web browsers and even some multimedia authoring programs don't support custom color palettes properly. For these instances, use the System option instead.

GIF file size: 20K

For photographic images, the JPEG format is often preferable to GIF for Web-site work. Besides allowing for very compact files, JPEG, unlike GIF, isn't limited to 8-bit color. JPEG, however, can introduce undesirable artifacts, particularly where high-contrast areas meet (note the sky above the hats).



JPEG file size: 4K

DON COCHRAN

CD-ROM: Creating a Palette for Multiple Images

If you need to display multiple images on the screen simultaneously, you can create a single superpalette to best accommodate the colors used in all the images. (Sorry, the computer can work with only one custom palette at a time.) Then specify that your authoring program load this superpalette when displaying those images. Equilibrium Technologies' DeBabelizer is the best tool for creating superpalettes.

CD-ROM: Cross-PlatformWoes

In the video circuitry on some Windows computers, the first and last ten entries in a color palette are reserved, limiting you to a 236-color palette. If you prepare a 256-color adaptive palette for a given image and then display the image on a Windows machine, some colors may not display properly. The workaround: Use DeBabelizer to create a custom palette in which the first and last ten entries are designated as off-limits. You'll find instructions in the excellent book *Designing Multimedia*, by Lisa Lopuck (Peachpit Press, 1996). Dither your images to the resulting 236-color palette.

Web: Think Twice about Adaptive Palettes

On 256-color displays, a Web browser imposes its own built-in color palette, which is very similar to the standard system palette. If you prepare images with an 8-bit adaptive palette, they'll look horrible on 256-color monitors. Their adaptive palettes will, however, kick in on a 16- or 24-bit display. This palette paradox distills into a simple rule: If you require your site's visitors to have 16- or 24-bit displays and you want compact, fast-loading graphics, dither to an 8-bit adaptive palette. Otherwise, dither to an 8-bit system palette.

range of hues, for instance—you may be able to get by with even lower bit depths, such as 4-bit (16 colors). Macromedia Director supports techniques such as color cycling and palette transitions to let you add impressive color effects to low-bit-depth images.

The same rule applies if you're creating GIF files for the Web: reduce your graphics to the lowest depth that still provides acceptable image quality.

Need Top Quality? Provide Alternatives

With good source images, careful palette manipulation, and the right file formats, you can shoehorn remarkably good-looking graphics into a small file. Even so, there may be times when you just have to have 24-bit quality—in a title or site on fine art, for example. For these cases, provide your graphics in two versions and let users choose the one that meets their quality requirements and hardware capabilities. Display the low-quality images by default, but provide a way to get to the high-quality versions—by clicking on a low-quality image, for example.

Watching an image on a weight-loss program can be demoralizing—no one ever said dieting was fun—but the Bandwidth Conservation Society (*http://www.infohiway.com/faster*) can suggest lots of graphical diet plans and examples. **m**

Next month: Screen-layout tools and tips

Contributing editor JIM HEID produced the CD-ROM that accompanies his *Macworld New Complete Mac Handbook*, fourth edition (IDG Books Worldwide, 1995).

WHICH FORMAT FOR WEB GRAPHICS?

One of Your Biggest Decisions for Web Graphics Is What File Format to Use

GIF versus JPEG Graphics Interchange Format (GIF) is the most popular format. Interlaced GIF files arrange their data to allow for a faster perceived display: instead of oozing onto the screen from top to bottom, an interlaced GIF appears in a coarse form almost immediately, and then gets progressively sharper. All GIF files also support transparency, an attribute that enables an image to blend with the Web page's background color.

You can create interlaced GIFs with the Photoshop 3.X plug-in Adobe GIF89a (available at *http://www.adobe.com*). The $25 shareware PhotoGIF from BoxTop Software (601/324-7352, *http://www.aris.com/boxtop*) is an excellent Photoshop plug-in for creating GIF files. Version 1.6 of Equilibrium's must-have DeBabelizer utility can also build interlaced GIFs, as can Adobe's PageMill Web-page–design program.

Due to differences in the way the GIF and JPEG formats compress image data, GIF delivers better results and smaller files for line art and solid colors. GIF is also better for images containing sharply contrasting borders, such as a black line adjacent to a white one. But GIFs are limited to a color depth of 8 bits—256 colors. For photographs, the JPEG format tends to deliver better results as well as smaller files. Experiment with different compression settings to arrive at the optimum balance between image quality and file size.

Note: Many older Web browsers can't display JPEG files alongside text and other page elements. For graphics that reach every possible browser, GIF is currently your best bet.

Newcomers Two up-and-coming graphics formats promise more choices. One is progressive JPEG format, which provides an effect similar to interlaced GIF: an image appears in crude form quickly and gradually sharpens. Progressive JPEGs also tend to be slightly smaller than conventional JPEGs. You can create progressive JPEGs using BoxTop Software's ProJPEG, a $25 shareware Photoshop plug-in. Alas, few browsers can display progressive JPEGs; at this writing, ones that can include Netscape Navigator 2.0; Spyglass's Enhanced Mosaic 2.1; Microsoft's Internet Explorer; and Lighthouse Design's OmniWeb, which runs under the NextStep operating system.

Portable Network Graphics, or PNG (pronounced *ping*), supports 24-bit images as well as an impressive interlacing scheme. Unlike JPEG, which sacrifices image quality, PNG provides lossless compression. Several graphics-conversion utilities, including DeBabelizer 1.6.5 and Lemke Software's GraphicConverter 2.2.2 ($35 shareware fee, *100102.1304@compuserve.com*), can create PNG files. Alas, PNG support among browsers remains spotty; most notably, Netscape Navigator 2.0 doesn't support it.

Publishing Workshop

A Guide to Getting Great Line Art

by Steve Roth

Compared with the vagaries, uncertainties, and general black magic that swirl around gray-scale and color scanning, scanning line art—logos, ink drawings, and the like—should be incredibly easy. You don't have to worry about tonal correction, color shifts, or any of the other ills that scans are heir to.

So why is it that most scans of line art come out looking lousy? Fine lines are broken up, dense areas are clogged, there's no fine detail anywhere, and everything looks jaggy.

Here's an even better question: How can you produce line-art scans that look as good as photographically reproduced line art? In fact, it's pretty easy, even with lower-quality scanners. It's one area of digital imaging where you can actually reproduce the original *exactly*, or close enough so the human eye can't see the difference. With a few simple techniques and a decent original, you can produce scans of incredibly detailed line art—like those engravings in Dover clip-art books—that equal or exceed the quality of photographically reproduced line art. There are two key things to know.

• You need at least 800-pixels-per-inch (ppi) image

300 ppi, 52K

600 ppi, 203K

900 ppi, 458K

1200 ppi, 812K

DIFFERING RESOLUTIONS The four examples shown here demonstrate the kind of detailed line-art scans you can produce even with an inexpensive gray-scale scanner. They also demonstrate the importance of high image resolution in achieving that reproduction. While lower resolutions, like 300 ppi, tend to show jaggies, broken-up fine lines, and clogged shadows, the difference between the higher resolutions is more subtle. The 1200-ppi scan looks almost identical to the 900-ppi version up close, but at normal viewing distance the 1200-ppi version is crisper and snappier, has more contrast, and better represents the original.

resolution. You *can* see the difference between 800- and 1200-ppi line art, though admittedly it's subtle (see "Differing Resolutions").

• You must scan the line art as gray scale so you can enhance the scan in an image-editing program.

Resolution

I can hear your cries of panic already: "He says I need 800-ppi resolution for line art, but I'm sitting here with a 300-ppi scanner." First, understand that you never need image resolution higher than output resolution. If you will be printing on a 600-dpi laser printer, you don't need more than 600-ppi line art.

Second, remember the relationship between scaling and image resolution. When you place a scanned image in a page-layout program and scale it, you are altering the image resolution. Suppose you've got a 2-by-2-inch, 300-ppi scan, for instance. Place the image on a page and scale it down to 50 percent (to 1 square inch) and you've packed the same number of pixels into half the space (actually a quarter the area), resulting in a 600-ppi image.

So you can overcome your scanner's limited resolution by scanning a large original at full resolution, then scaling it down on the page. If you are working with a small original, try scaling it up photographically before scanning. Even a quality photocopier will often suffice, though you may have to clean up the resulting scan a bit.

If the scan-big-and-scale-it-down approach still doesn't give you the resolution you need, try enhancing resolution (see step 1 in "Manipulating Gray Scale into Line Art"). **m**

Contributing editor STEVE ROTH is the editor of *Real World Photoshop 3* (Peachpit Press, 1996).

Manipulating Gray Scale into Line Art

THE KEY TO PRODUCING QUALITY LINE-ART SCANS is the ability to work digital-imaging magic on them. That's pretty much impossible with black-and-white (aka *line-art, one-bit, bilevel,* or—in Photoshop parlance—*bitmap*) scans, so you have to scan in gray scale, work your wonders, then convert to line art. Here's the procedure. I'll concentrate on Photoshop's tools, but the techniques and concepts apply no matter what tools you're using.

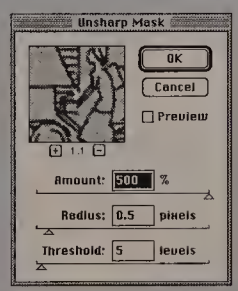
1

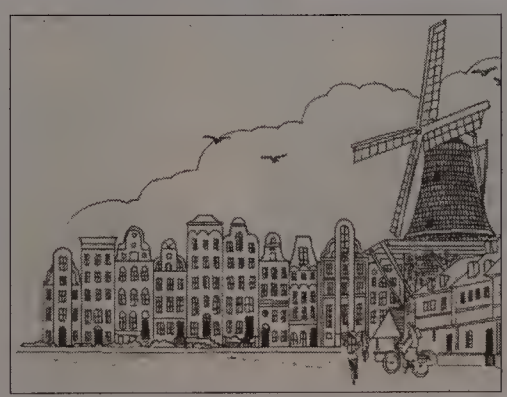
RESOLUTION ENHANCEMENT Usually, adding pixels to a scan based on the pixels that are already there is useless. This technique is the primary exception; it converts information in the gray-scale scan into higher-resolution line art. Scan an image at your scanner's highest optical resolution (say, 300 ppi). In Photoshop's Image Size dialog box, upsample it to twice the resolution (600 ppi). Turn off Constrain File Size so Photoshop adds interpolated pixels to the image. The file grows by a factor of four (resolution doubles horizontally and vertically), but it's only temporary.

Image Size dialog box

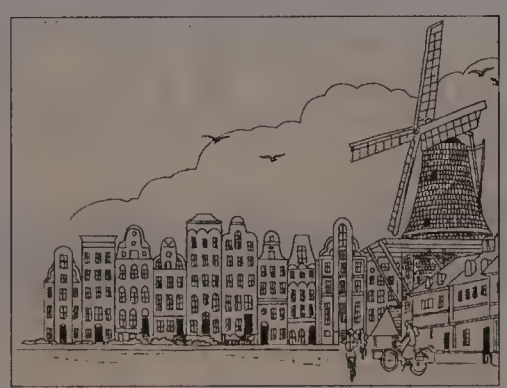
2

SHARPENING *Nothing* improves line-art–scan quality like sharpening. Any sharpening filter works wonders, but I use two passes of Photoshop's Unsharp Mask. Set Amount to 500%, Threshold to 5 levels, and Radius to *resolution* ÷ 1200 (with a 600-ppi image, 0.5). Run the filter, then press ⌘-F to run it again. Sharpening accentuates the differences between pixels, distinctly delineating black and white areas.



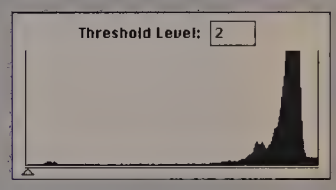


Original gray-scale scan (top); sharpened gray-scale scan (bottom).



3

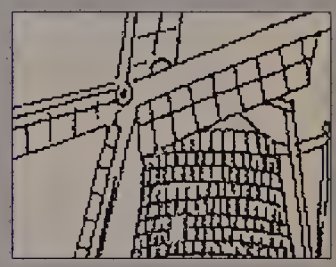
THRESHOLDING You've got a sharpened gray-scale file, but all you want is black and white. To tell Photoshop which pixels should be black and which white, bring up the Threshold dialog box (press ⌘-T). Move the slider back and forth; you'll see the scan get lighter (at one end, fine lines break up) and darker (at the other end, dense areas clog). Work the trade-off to achieve the best balance for your image.



Threshold dialog box

For many scans, especially those with no dense areas, a threshold of 2 (on a scale of 256) does the job. For more detailed art, such as this windmill, you might go as high as 128. You can trust what your monitor shows you, but bear in mind magnification and the final size; you may be sweating details that will never show in print.

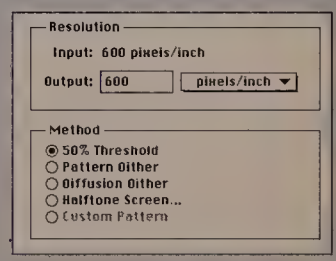
Unsharpened



Sharpened

4

CONVERTING TO LINE ART Now you've got a 600-dpi gray-scale scan, but all the pixels are either black or white. To get rid of the extra 8-bit gray-scale information, convert to bitmap (1-bit) mode using the Mode menu (select 50% Threshold in the Bitmap dialog box). The image looks the same, but your file shrinks to one-eighth of its current size—half that of the original scan. It's ready to drop into pages and print.



Bitmap dialog box

You don't have to go through all these steps in Photoshop. Often, scanning software can do the interpolation as you scan, for instance. Anyone who has Hewlett-Packard's DeskScan or Light Source's Ofoto can do most of the steps while scanning. And the CopyDot mode in ScanPrepPro, a $695 Photoshop plug-in from ImageXpress (770/564-9924, *scanprep@mindspring.com*), will do the whole works automatically, producing some of the best line-art scans I've seen.

APRIL GREIMAN

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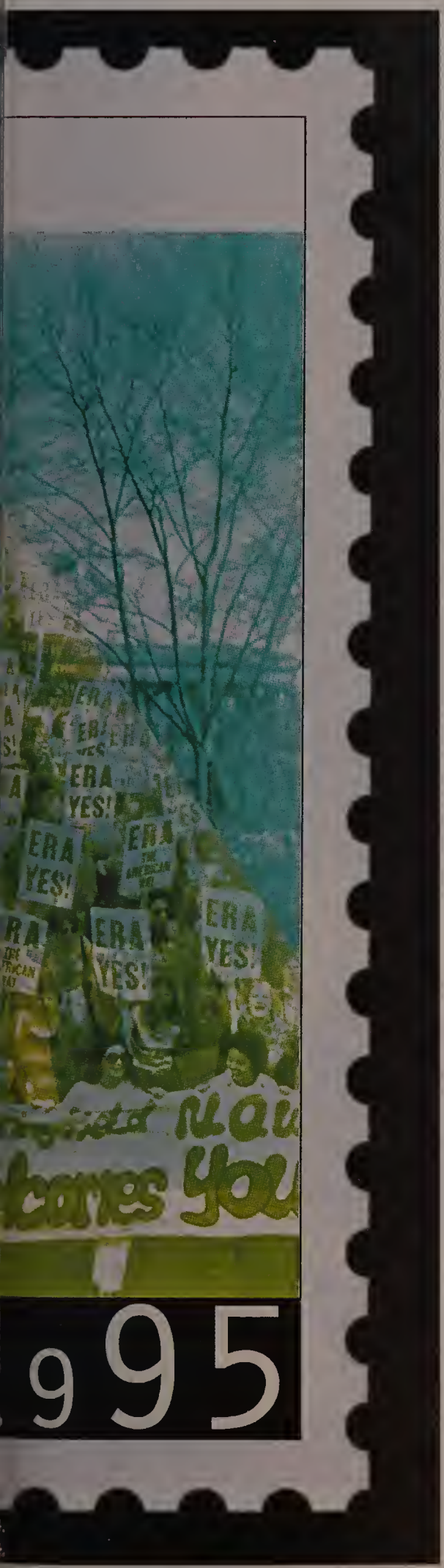

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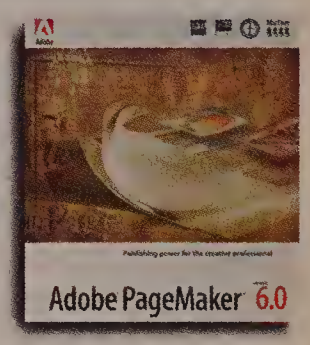

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Graphics Workshop

A Shattering Effect on a 3-D Model

by Cathy Abes

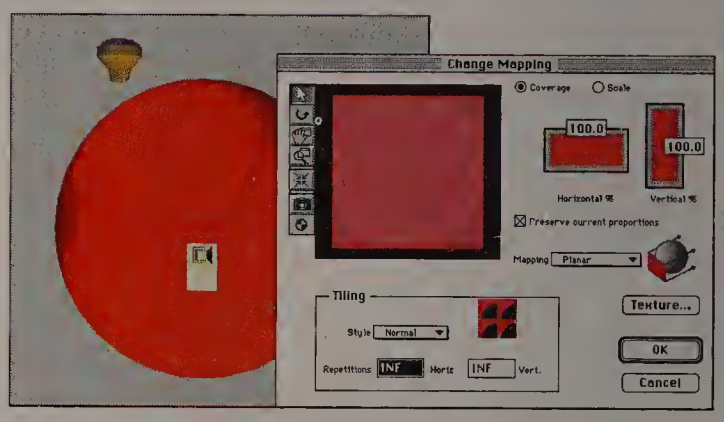
ARTIST: Jack Harris is an illustrator and designer whose work has appeared in the Museum of Modern Art in New York. With clients ranging from Hewlett-Packard to Tyco Toys, he has been recognized by *Print* and *How* magazines, and by the Society of Publication Designers.

HOW IT WAS DONE: Harris wanted to create a futuristic 3-D face that looked as if it was partly shattered, but he wanted to have complete control over the effect—which areas of the face would be shattered and to what degree. In Illustrator, he used the freehand tool and the Exclude filter to create white shapes on a black background. This became the basis for a texture map that he would later apply to his 3-D model in Strata StudioPro Blitz (the QuickDraw 3D version of StudioPro).

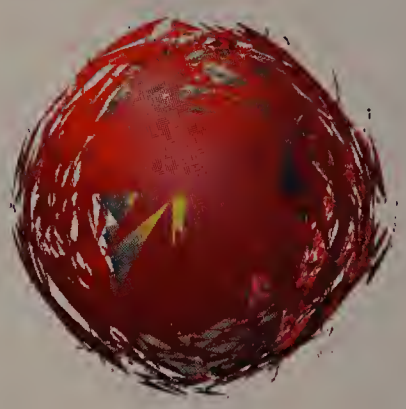
After importing the Illustrator image into StudioPro, Harris experimented with various mapping methods—spherical, cubic, decal, and planar—applying each one to a simple sphere; all but the planar method distorted the map. Shatter Animator, a special-effects filter, didn't work either, because he couldn't apply it selectively to just the areas he wanted shattered—the eye sockets and the nose.

The technique that finally succeeded for Harris was to combine the planar mapping method with the transparency map. But he wasn't able to achieve the full transparency he wanted in the area around the eyes and the nose. Finally he realized that dragging the transparency slider in the Texture Editing window wouldn't do the trick; setting the transparency level in the Expert Texture Editing window was the only way to get that degree of precision. m

1 This Illustrator image, a combination of shapes Harris drew with the freehand tool and the Exclude filter, became the basis for the texture map he would later apply to his 3-D model in StudioPro.



2 Using a simple sphere to approximate the head, Harris experimented with several mapping methods in StudioPro and found that each method distorted the sphere in a different way. He finally settled on planar mapping, with the parameters shown here.



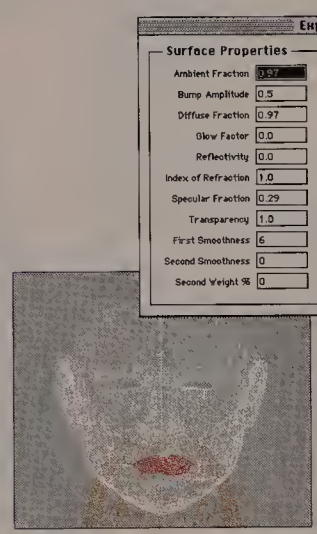
3 The planar mapping worked best, but it still didn't give him the effect he wanted: confining the shatter effect to the areas where the model's eyes and nose would be.

THE TOOLS

Hardware: Power Macintosh 7500/100; 150MB of RAM; 1GB internal hard drive; 1GB external hard drive; external Iomega Zip drive; AppleVision 1710 AV 17-inch monitor; Radius PhotoEngine video card.

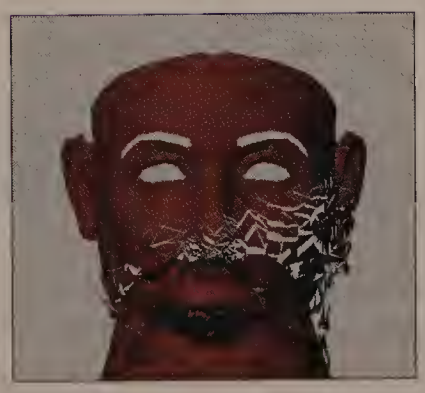
Software: Adobe Illustrator 5.5, Photoshop 3.01; Strata StudioPro Blitz 1.75; QuickDraw 3D 1.0.3.

7 The 3-D model prior to rendering, as seen from the camera's perspective—an extreme close-up view using a wide-angle lens, with the two light sources shown.



6 Applying the transparency map to the model to create the skin texture worked once Harris discovered that the transparency level had to be at its highest setting (1.0) to achieve full transparency—and the only way to set it precisely was in the Expert Texture Editing window.

4 Next he applied Shatter Animator, a special-effects filter. But he still could not specify the areas to be shattered or the effect's point of origin. Because StudioPro supports QuickDraw 3D, it displayed the model using Phong rendering instead of the flat, shaded preview that most 3-D renderers provide.



5 Even though StudioPro produced a realistic-looking preview, the actual rendered version nevertheless looked dramatically different from the preview.

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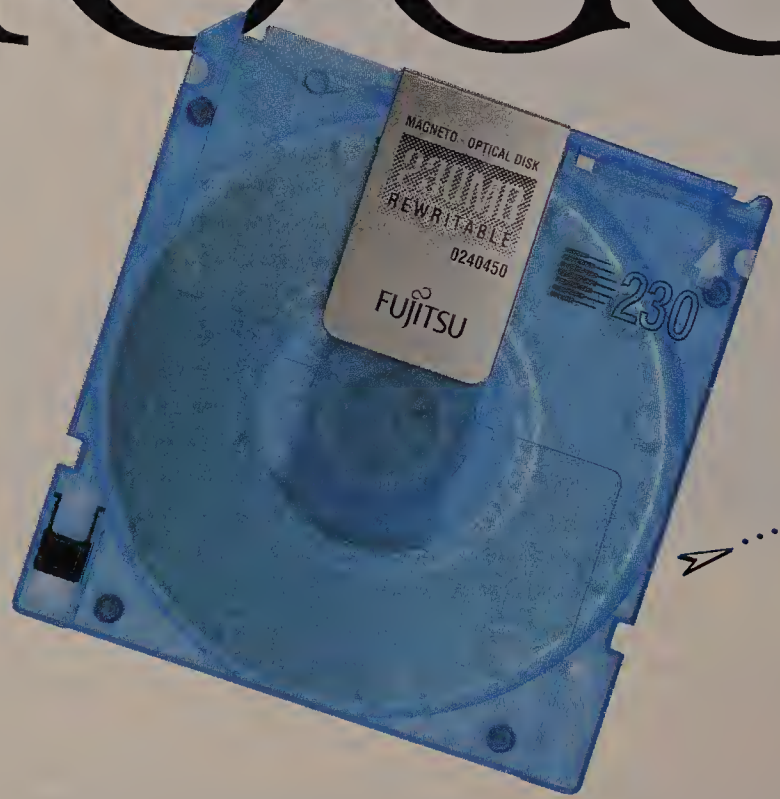

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Buyers' Tools

Presentation Panels

MACWORLD LAB UNCOVERS LCD PANELS WITH A SHARPER IMAGE

by Dan Littman

Remember the key to a great performance? Great delivery, of course. If your job involves pitching ideas to colleagues or pitching products to customers, you know that timing and pizzazz can make you the star of your own show. An LCD panel, which sits on an overhead projector and shines the image from a computer or video source onto a wall or movie screen, could be just the ticket to putting your name on the marquee.

Integrating an AV tool such as an LCD panel into a verbal meeting of the minds offers definite advantages. It lets you present your ideas visually, makes a more memorable impression on your audience, and entertains them a bit. More important, with an LCD panel you gain some control over group dynamics: you set the pacing of questions, you make the transitions between topics, and of course, you place yourself in the limelight.

You gain that control, that is, if you're not fumbling with an awkward remote-control unit. And therein lies the rub: we looked at 14 panels, ranging in price from $3295 to $9995, and found that, though the wretched image quality of recent years has given way to quite satisfactory panels that can indeed project a professional image, these gizmos still have far to go in the usability department.

Before you plunk down that kind of money, think about the trade-offs of paying for and using a panel versus sticking with overhead transparencies or even old-fashioned flip-charts. LCD panels are costlier, heavier, and bulkier than transparencies; like most electronic devices, they can be finicky to set up and frustrating to operate, and they can break.

KEVIN CANDLAND

On the other hand, what an LCD panel gives you for your money is great flexibility: it can present animations, display Netscape Navigator to show off your company's Web site, or reveal a spreadsheet to calculate the answer to a question you hadn't anticipated.

When you shop for an LCD projection panel, attempt to test them carefully: create a simple presentation, bring along a friend for a second pair of eyes, and go through the whole process, from plugging in the wires and adjusting the image quality to testing the microphone and the remote control.

If your dealer can't provide a good test space—these panels are designed for use in a smallish room for an audience of up to 30—be sure to get a 30-day money-back guarantee. If you can test at the dealer's, call ahead to verify that a transmissive overhead projector is available; reflective projectors won't work. (And once you own an LCD panel, don't get complacent: before any presentation allow a half-hour to set up, test, and adjust your system with the Mac and overhead projector you'll be using.)

There are also LCD panels with projectors built in; we didn't look at those for this story. Panel-projector units cost a couple thousand dollars more but can project a bright image farther to a bigger

screen (see "Portable Presenters," *Macworld*, January 1995).

As you shop, concentrate on two fundamentals to investigate: image quality and ease of use. And just as important, does higher quality come at too high a cost?

Cultivating Your Image

Macworld looked for crisp text, strong, accurate colors, and clear edges, as well as smooth motion of objects in a QuickTime movie. LCD panels tend to fall down on some colors—most panels rendered lavender as bright blue, for example—so don't expect even the best units to look as good as your Mac screen.

In our broad array of subjective tests the $6750 Apollo Vision Q3 came out on top, followed closely by the dramatically less costly, $3995 Telex MagnaByte M3xv (see the benchmark "LCD Panels: Seeing Is Believing"). The Vision Q3 took top honors on text, QuickTime movies, and a photographic image. Chisholm's $4995 Rainbow 30/10 and the $5695 nView Z215 followed closely behind the two leaders.

Our testing showed definitively that price is not a reliable predictor of image quality. In Focus Systems' $9499 PowerView 950V displayed text as crowded and hard to read; the entire projected image seemed dwarfed and had a yellow tint with washed-out colors.

When we spot-checked the display of video directly from an NTSC source—that is, video intended for a television rather than a computer (we used a laser disc)—quality took a nosedive. Few panels were able to keep up with the view from an airplane as it zipped over scrubby desert trees, displaying instead a blur of shifting polygons, though the Telex unit did the best. The desert's bright earth tones appeared as muted grays and browns, while from an indoor clip, "video-legal" shades of crimson and teal, which any monitor or other video-display system should be able to handle, popped out so brightly that they looked like fluorescent paint. Overall, we suggest that you display real video with a television—or convert your video to QuickTime movies.

The Learning Curve

No LCD panel is as easy to set up as we'd like. First you must assemble the correct sequence of cables and adapters and plug them into all the right ports. Chisholm's Rainbow simplifies this process with clearly labeled ports and cables, as well as cables of adequate length.

Some units with multiple video-in ports must be told where the signal is coming from; in the case of Sayett's $4875 Datashow AV 4500, the command to select the port is unmarked, though we managed to hit it, with some trial and error, in the DOS-like prompt system.

Once you have the Mac's video signal flowing to a panel, you have to adjust color, brightness, and contrast; align the Mac video with the panel's edges; and so on—tasks you don't want to perform while your audience waits. Unfortunate-

Company	Product
Apollo Presentation Products	Vision Q3 LCD Panel
Boxlight	ProColor 1701
	Editors' Choice
Chisholm	Rainbow 30/10
Dukane Audiovisual Products	MagniView 488B
In Focus Systems	SmartView 3600
	PowerView 950V
nView	Z215
Polaroid Electronic Imaging Systems	Polaview 3000
Proxima	Ovation 810
	Ovation 846C
Sayett Technology	Datashow AV 4500
Sharp	Sharp QA-2500
	Editors' Choice
Telex	MagnaByte M3xv
VRex	VR-1000 3-D Stereosco
	LCD Projection Panel

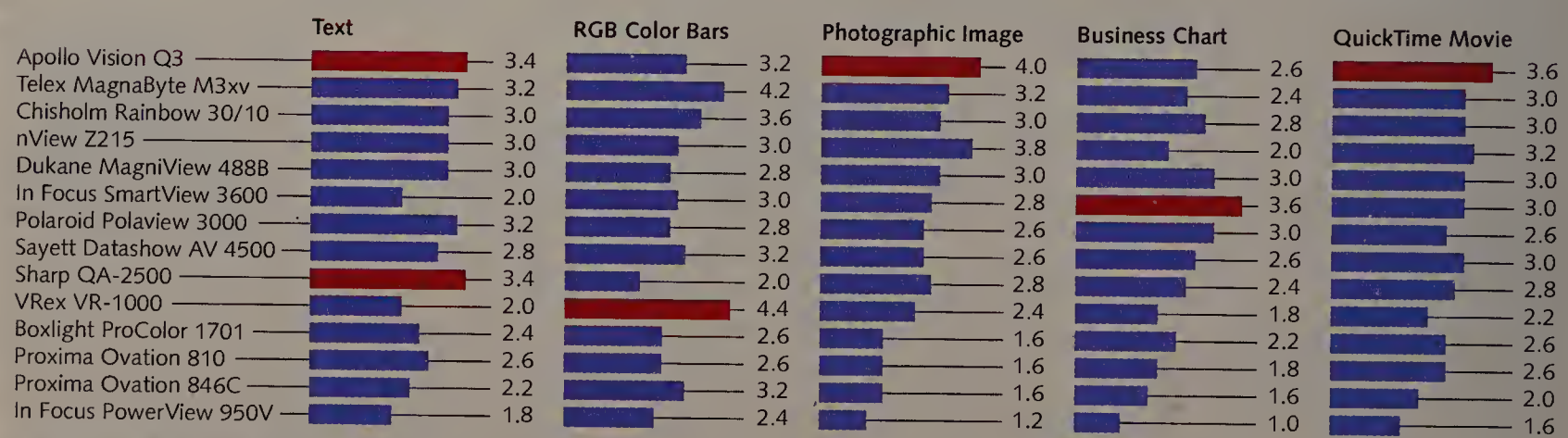
* *Based on features, implementation, innovation, performance, re*

C = 16.7 million colors supported; P = pointer device; R = remot

MW LAB LCD Panels: Seeing Is Believing

Years of Macworld Lab testing have proved that objective measures of brightness and contrast are not reliable predictors of the only critical LCD-panel performance benchmark—how good the image looks. Therefore, seasoned *Macworld* editors, artists, and designers gave each panel a subjective critique in a range of key areas. The Apollo and Telex units led the pack, though at least half the units offered acceptable quality in most tests.

Best results in test. Longer bars are better. Products are listed in overall order of performance.



BEHIND OUR TESTS Each evaluator gave each panel a subjective score—from 1 to 5, with 5 representing a perfect score—in the following critical areas: text clarity; color clarity and fidelity in primary-color bars, a complex photographic image, and a business chart; and color clarity and fidelity, as well as smoothness of motion, in a QuickTime movie. Remember that every unit's performance can be enhanced by fine-tuning the colors. And over time, your eyes adjust to viewing images in a darkened room, so the longer you look, the better the images appear.—**Macworld Lab testing supervised by Matt Clark and Jeff Sacilotto**

r Rating*	List Price	Phone	Included Features**
★★/5.9	$6750	516/467-8033	B, C, P, R, S, V
★★/4.3	$6499	360/779-7901	C, R, V
★★/7.2	$4995	408/559-1111	B, C, R, S, V, VO
★★/5.2	$4995	708/584-2300	R, S, V, VO
★★/5.5	$3799	503/685-8888	B, R, S, V
★★/3.5	$9499	503/685-8888	B, R, S, V
★★/5.6	$5695	804/873-1354	B, C, R, S, V, VO
★★/5.4	$5295	617/386-2000	B, C, P, R, S, V
★★/5.0	$3295	619/457-5500	R, V, VO
★★/4.7	$5995	619/457-5500	C, R, S, V, VO
★★/3.3	$4875	716/624-1290	B, C, R, S, V
★★/4.0	$9995	201/529-8731	B, C, P, R, S, V, VO
★★★/7.1	$3995	612/884-4051	B, C, P, R, S, V, VO
★★★/5.0	$6995	914/345-8877	C, R, V

*ility, ease of use, and value. (See Star Ratings section for explanation.) ** B = built-in speakers; ntrol; S = Mac-compatible sound-in; V = Mac-compatible video-in; VO = video-out jacks and cables.*

ly, the menus for setting up and operating the panels are almost universally dismal. The Chisholm Rainbow is a happy exception, with menus that are both easy to understand and easy to operate.

OK, the audience is seating itself and it's time for the show. You're standing there with an infrared remote control in your clammy hand—but will it work? Most panels are designed with the IR reader facing the screen, so you can probably aim the remote's infrared beam at the screen and rely on the panel to pick up the beam's reflection. But depending on the lighting in the room, how bright the screen is, and other lighting factors, you may have to face the panel when you click the remote, or wield the remote like a tennis racket on a backhand return.

Unless you have a lit podium, you'll be working in the dark, and none of the remotes have a light. The Sharp QA-2500 and Telex units have backlit buttons; unfortunately, the Sharp remote's copious supply of buttons (more complicated than a VCR equivalent) are marked with incomprehensible icons. Worse, when you activate the backlighting, it doesn't stay on long enough to give you a good look at the buttons. And to top it off, the Sharp has byzantine menus—they might allow a technician to adjust the image quality to stunning, but set to factory defaults the unit came out squarely in the middle of the pack. The Telex remote isn't much better, but its menus are easier to understand.

Sorting Out the Extras

This crop of LCD panels come with an astounding variety of fancy features—some useful, some silly, and some you may never figure out how to use.

A Few Pointers Being able to point to or manipulate objects on the screen is probably the most useful extra to look for. If you simply need a bright dot to wave about on screen, the Apollo, Polaroid, Sharp, and Telex units provide that.

Some systems go quite a bit further. For example, the Sayett Datashow has a software-based arrow that you steer from the remote control with a combination of thumb buttons, similar to the control pad for a video game; you can change colors and, with practice, switch between pointing and drawing on screen.

Chisholm offers the best solution—an excellent tablet ($1195), made by CalComp, that communicates with a controller in the Rainbow; it can operate as a mouse and provides all the drawing tools you expect from a tablet.

Can You Hear Me? Most of the units we looked at have built-in speakers and sound-in ports, but none of them sound particularly good. You'd certainly do better with a pair of small speakers attached to your Mac (see "Multimedia Speakers," *Buyers' Tools*, March 1996).

Look Ma, No Mac One interesting innovation is the LiteShow option for the In Focus panels. LiteShow-equipped units include a built-in floppy drive and software that saves presentation graphics from the Mac to a special format that the panel's drive can read. Therefore the panel can operate with no Mac attached.

Look Ma, 3-D One brave LCD panel vendor, VRex, has taken the plunge with support for stereo display of 3-D graphics. The VR-1000 comes with several pairs of 3-D glasses and a utility that converts images created with 3-D renderers into a stereo format. The effect is stunning; unfortunately, stereo 3-D images don't integrate well with standard PowerPoint or Persuasion slide shows.

On the Road If you spend much of your working life jetting from Munich to Houston to Shanghai, consider these practical factors: The panels in this batch each weigh about as much as a hefty laptop computer—not bad, as long as there's a transmissive overhead projector available at your destination. The nView Z215 takes the globe-hopping prize, with a well-padded and sharp-looking briefcase affair. But whatever comes with the panel, consider buying a single case that holds both a PowerBook and an LCD panel.

All of the products in this article adapt automatically to the 220-volt current you'll find overseas. Most, but not all, can auto-adapt to the PAL and SECAM video you'll find there.

The Last Word

The current crop of LCD panels look good and can do what you need them to do—if you conduct dress rehearsals for your presentations. We only hope that the human-interface designers will make as much progress with the next generation of LCD panels as the engineers have made with this one. **m**

Macworld senior associate editor DAN LITTMAN has been reporting on business technology for ten years.

LCD PANELS

When shopping for LCD projection panels, look for an easy-to-use product with good image quality

★★★★/7.2 **Rainbow 30/10** The team that designed this unit deserves a raise. They thought of everything from relatively simple menus, and a remote control that makes operating menus easy, to clearly labeled cables and ports. The Rainbow also performed well on image quality. **Company:** Chisholm. **List price:** $4995.

★★★★/7.1 **MagnaByte M3xv** For graphics projected from the Mac, this unit nearly matched the top performer, the far-costlier Apollo unit—and it trounced the Apollo on NTSC video. It's a great value. **Company:** Telex. **List price:** $3995.

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Circle 47 on reader service card

by James A. Martin

Surfing the World Wide Web for Travel Savings

GO ONLINE BEFORE YOU GO ON VACATION

HEADING TO CHICAGO? Here's a tip: Consider staying downtown at the Drake. It's an elegant 1920s hotel, the kind where you can sit around sipping afternoon tea in the lobby while a harpist gently plucks away in the background.

Sound too rich for your blood? Then here's another tip: Spend a little time with your Mac, a modem, and the Internet. You'll be surprised at the travel bargains—such as a $99-per-night rate at the Drake—that you can find.

Online services and the World Wide Web offer plenty of ways to stretch your travel budget, from electronic auctions to quick comparisons of airfares and discounted tour packages. Here's a road map to some Internet sites that can help you save money on your next trip.

Roaming the Online Services

Among the online services, CompuServe (614/529-1340) has the strongest suite of airline reservation systems—you can compare airfares on the United Connection (*Go United*), easySabre (*Go Sabre*), and Worldspan Travelshopper (*Go Worldcim*) systems. With the notorious fluctuations and inconsistencies of airfares, and because not all of the systems list the same airlines, it pays to shop around: United's system (which includes some 550 airlines) recently quoted prices from $437.50 to $1380 for a round-trip ticket from San Francisco to New York, while easySabre listed fares for the same route beginning at $290.

America Online (703/453-1899) has the best complement of discount travel sites, including Travelers Advantage (keyword *TA*), which offers up to 50 percent off regular hotel rack rates (albeit with some restrictions); Arthur Frommer's Secret Bargains (keyword *Arthur Frommer*), featuring an opinionated guide to discount airfare consolidators; and Preview Vacations (keyword *vacation*).

With tour packages nicely illustrated by color photos, detailed descriptions, and a handful of QuickTime movies, Preview Vacations is an entertaining place to shop for vacation deals. Available destinations are limited to the most popular (Hawaii, Mexico, Europe, major U.S. cities, and so on), but you will find some attractive deals. A recent example: for $486, you could get three nights at a Kauai resort, a midsize rental car, and a full daily breakfast. That package would cost about $609 otherwise, excluding breakfast. Preview Vacations also holds monthly auctions (both on AOL and at its popular Web site, *http://www.vacations.com*), in which bids are submitted via E-mail for trips to Mexico, the Caribbean, and other destinations.

Traveling the World Wide Web

As travel bargains go, it's hard to top a free round-trip airline ticket. But the profusion—and resulting confusion—of frequent-flier programs makes it difficult to get the most from them. Luckily, there's an Internet site, WebFlyer (*http://www.insideflyer.com*), devoted entirely to helping you stay on top of all the airline program changes and promotions. You'll find, among other features, a helpful list of the top ten current deals for earning or redeeming rewards; loads of advice on how to maximize your mileage; and a side-by-side, detailed evaluation of the major awards programs.

If you *must* pay for your plane ticket, there are a few Web sites that can help ease the pain. Stop by The Cheap Travel Page (*http://www.prairienet.org/~dbrown/travel.html*), an irreverent but advice-packed site with useful tips on where to find rock-bottom airfares, among other things. Another site, Airline Tickets WholeSale (*http://www.traveldiscounters.com*), promises 17 to 30 percent off domestic fares over $300 within the 48 contiguous United States. The site is largely an explanation of the company's services, rather than a fully interactive experience, and discounts are limited to seven airlines. Nonetheless, you'll find some choice specials every month, and the regular discounts make this a worthwhile stop on your Internet itinerary.

Don't forget to see if your favorite airline has a Web site, as a few are offering special deals exclusively for visitors to their home page. Cathay Pacific Airways (*http://www.cathay-usa.com/*), for instance, offers contests and mileage reward promotions from its site and plans to hold occasional cyber auctions. In its first auction, held last September, Cathay Pacific took bids for a round-trip ticket on its rarely discounted business-class Los Angeles–Hong Kong route. The winning bid was about 50 percent below the standard fare.

continues

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Bugs and Turkeys

Admittedly, we sometimes wish Microsoft would go away, but really! ClarisWorks 4.0 is taking things a little too far—it doesn't have a translator for Word 6 documents. Claris is working on one, but in the meantime users must save their Word documents in a pre-6.0 format or use DataViz's $99 MacLink-Plus/Translators 8.0 (203/268-0030, *info@dataviz.com*). Claris, 408/987-7000, *info@claris.com*.

Wacom, the tablet maker that got dinged in this space in March for failing to provide owners of its ArtZ II with Erasing Pen tablet a promised software patch for the 680X0 version of Fractal's Painter 3.1, this month deserves a halo—a Wacom technician came up with a solution on his own time. Both the patch (*ftp://ftp.wacom.com/pub/third-party/Fractal/Eraser_Update_Painter_3.1.hqx*) and the Erasing Pen script (*ftp://ftp.wacom.com/pub/third-party/Fractal/eraser_script.hqx*) are available online, or call Wacom at 360/750-8882.

Macworld will send you a Bug Report or Turkey Shoot T-shirt if you are the first to inform us of a turkey or a serious, reproducible bug that we report in this column. See How to Contact Macworld.

As for hotels, you'll find some of the best deals at Hotel Discounts (*http://www.hoteldiscount.com/*). A double room at the aforementioned Drake, for instance, recently went for $99, compared with the hotel's lowest weekend rate of $165. Unfortunately, at present Hotel Discounts' scope is limited—it covers just 12 cities and lists only a handful of properties for each one. What's more, to qualify for the low rates you must pay up front for the full stay, and the money is nonrefundable—considerable risks, to be sure. But with some careful planning, you could be savoring a cup of tea at the glamorous old Drake—and still have money left for a night on the town.

Letters

Glue News In March's *Consumer Advocate* column, a reader suggested using hot glue to prevent curious or mischievous persons from removing the retaining ring on mice. I say, go ahead and use Super Glue—it's easier. You can open any Apple mouse simply by removing a maximum of four screws. Personally, I'd rather use the four screws than mess with hot, melted glue.

GUY FORSYTHE
via the Internet

Searching Out User Groups Your *Conspicuous Consumer* column in the January issue ("Need a Hand?") was a godsend. However, having spent four hours on the phone—mostly on hold—over five days leads me to believe that there must be a better way to find local MUGs than through Apple's toll-free number (800/538-9696, ext. 500).

The telephone system is confusing and could neither answer my query nor transfer my call. Finally I reached a real human being who said he would connect me. I got through that time—and that time only—to be told, "There is no

continues

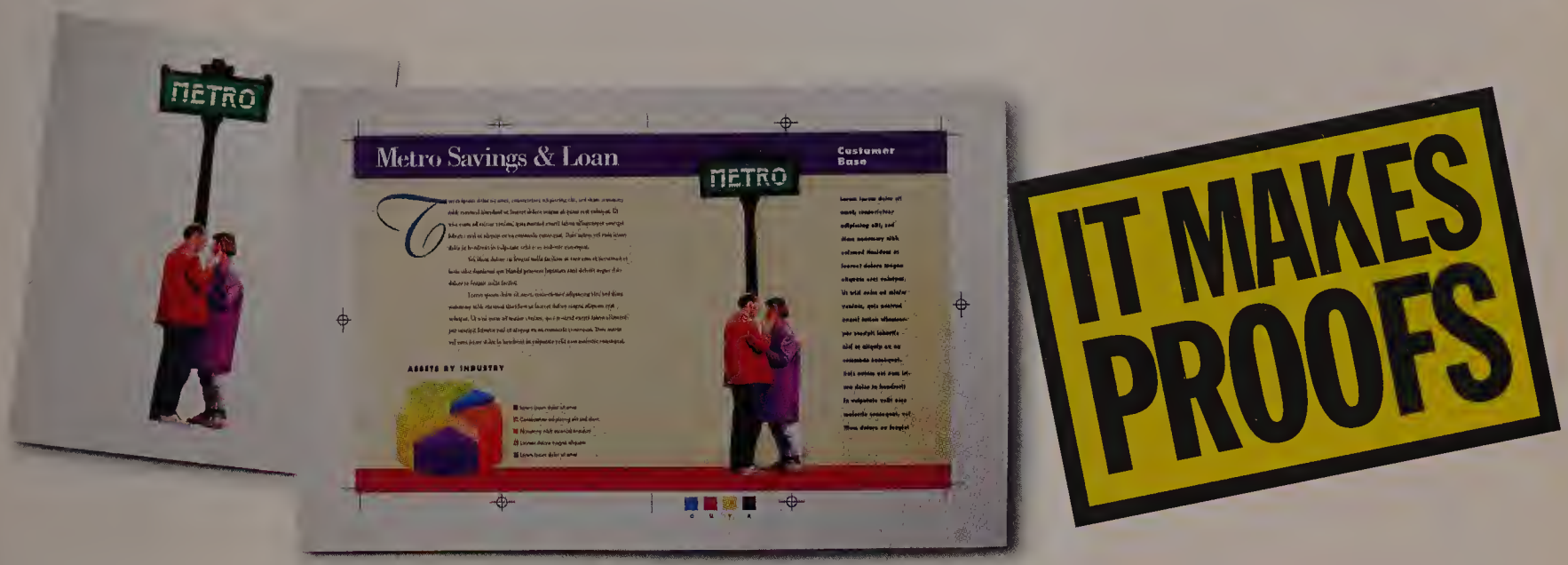
Streetwise Shopper

Big Business 2.0 A $149 competitive upgrade is available for any Mac or Windows version of ACT, Claris Organizer, DateBook and Touchbase Pro, FileMaker Pro, Mac P&L, Microsoft FoxPro, MultiLedger, M.Y.O.B., Now Up-to-Date and Now Contact, Peachtree Accounting, QuickBooks, or Quicken. Regular street price is $389. Big Software, 415/919-0200.

Pantone ColorDrive 1.5 Adobe Systems is bundling Pantone's color-management system (Nov 95 ★★★ version 1.0) with the Mac versions of Photoshop, PageMaker, and Illustrator. Available from mail-order channels through March 1996. Adobe, 415/961-4400.

Ray Dream Studio 1.0 Multimedia package (May 96 ★★★/6.9) is only $299 when purchased directly from Ray Dream (suggested retail price is $499). The company is also offering a discount on Ray Dream Illustration and Ray Dream Animation VHS-tape tutorials. The $29.95 tapes are $19.95 through the end of April 1996. Ray Dream, 415/960-0765.

[wax thermal]



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user group in your area," before the system hung up.

Would you be so kind as to send me the address and phone number of the Arizona Macintosh Users Group or BMUG, both mentioned in your January column? Perhaps through one of them I will be able to get the assistance I need.

RICHARD RUMAGE
Lake Havasu City, Arizona

You can reach AMUG in Phoenix, at 602/553-8966, and BMUG in Berkeley, California, at 510/549-2684.

Describing Apple's user-group hotline as "confusing" was kind, to say the least. I called six times and used practically every key on my telephone's keypad, and like Mr. Rumage, was able to get a listing of the Macintosh user groups in his area—none. The hotline searches only by zip code; you can't cast a wider net by using area codes or states. So I turned to other sources.

CompuServe didn't yield much, but America Online's User Group Forum (keyword UGF*) gives listings for user groups around the globe, plus links to various groups' Web pages. AOL also maintains an area that offers tips on publishing your user group's newsletter and on leading a user group, as well as a shareware library and message boards.*

For users with Internet access, searching on Macintosh user group *brings up a ton of listings. In addition to the Web sites listed in January's* Conspicuous Consumer, *check out Nathan's Everything Macintosh (*http://www.cs.brandeis.edu/~xray/macalt.html*) and Internet Interstate's Mac Web page (*http://www.intr.net/ts/user_groups.html*).*

Whether or not you have an Internet connection, you may find that your best sources of information are local computer retailers and the classified section of your local newspaper. Experienced user-group devotees check these first to scope out the local computer scene—give it a try.

If you have formed a new user group, or just want to update your club's information on Apple's user-group hotline, contact User Group Connection at 408/477-4277. (It does not *provide users with information or listings for local groups. For that information, call 800/538-9696, ext. 500, or visit the Web page at* http://www.ugconnection.org/.*)*

—SUZANNE COURTEAU

THE AMCOEX INDEX OF USED MACINTOSH PRICES

Machine (RAM/Hard Drive)	Average Sale Price	Monthly Change
PowerBook 140 (4MB/40MB)	$600	+$25
PowerBook 165 (4MB/80MB)	$850	–$50
PowerBook 180 (4MB/80MB)	$1200	–$50
PowerBook Duo 230 (4MB/80MB)	$750	$0
Mac IIsi (5MB/40MB)	$200	–$25
Mac IIci (4MB/80MB)	$450	+$50
Mac IIfx (4MB/80MB)	$400	+$25
Centris 650 (8MB/230MB)	$900	+$25
Quadra 800 (8MB/230MB)	$1075	–$50
Quadra 900 (8MB/160MB)	$1025	+$50
Power Mac 7100/80 (8MB/350MB)	$1475	–$75
Power Mac 8100AV (8MB/500MB)	$2250	+$75

Index provided by the American Computer Exchange of Atlanta (800/786-0717). It reflects sales during the week of February 20, 1996. Configurations include keyboard and exclude monitor and display board for noncompact models.

Service HERO

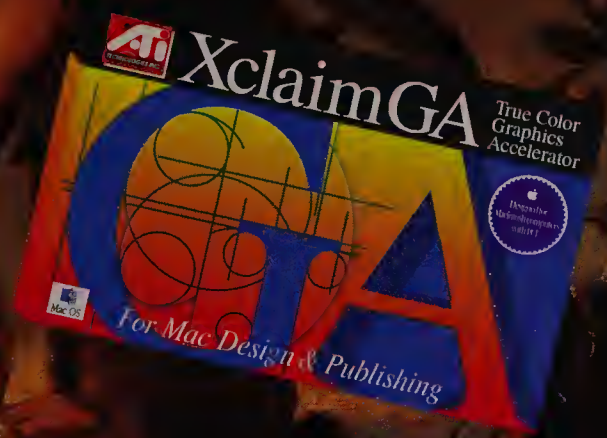
Jim Pinson of Mabton, Washington, wrote to tell us of the pleasant surprise he received recently when dealing with Tribe Computerworks.

After several failed attempts at connecting a TribeStar router, Pinson called tech support at Tribe Computerworks, explaining that he'd tried six different cables but still could not establish a connection. The technician he reached promised to send him a pretested cable. It arrived the next day, along with a transceiver on the chance the cable wasn't the only problem. A return envelope with the correct postage attached rounded out the package.

The new cable solved Pinson's problem; when he called his technician again, she told him he was welcome to keep the cable. "That," writes Pinson, "is my kind of tech support!"

Former *Macworld* editor JAMES A. MARTIN writes about travel and technology for *Travel & Leisure* and other publications.

Not getting the treatment you deserve? Or have you received heroic service? Write to the *Consumer Advocate* department at *Macworld*, 501 Second St., San Francisco, CA 94107, or send us a fax at 415/442-0766. m



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Macworld Star Ratings lets you compare Macintosh products based on the authoritative assessments in our reviews and features. The number of stars indicates the product's level of quality; each product also gets a numeric score that provides a more exact assessment of the product's quality within that level. We evaluate seven factors to derive the Star Rating: feature set, design implementation, performance, reliability, ease of use, innovation, and value. We take these evaluations, weight their importance for each class of product, and calculate the final score. The higher the score, the better a product is, even among products with the same number of stars. The following list shows how the ratings and scores relate.

★★★★★	9.0 to 10.0	Outstanding
★★★★	7.0 to 8.9	Very Good
★★★	5.0 to 6.9	Good
★★	3.0 to 4.9	Flawed
★	0.0 to 2.9	Unacceptable

This section also lists products that have been awarded an **Editors' Choice** designation in a *Macworld* product comparison.

If a product has been upgraded since our last assessment, the most recent version number appears in parentheses after the main reviewed version number. To read a full review of any product in the listing, please consult the issue indicated at the end of the listing or search for the product via Macworld Online (keyword *Macworld* on America Online; URL *http://www.macworld.com* on the World Wide Web).

Vendors: Please write to *Macworld Star Ratings*, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

software

BUSINESS TOOLS

★★★★/8.8 **4th Dimension 3.5,** ACI US, 408/252-4444, $895. Leading Mac database gets important improvements. *Mar 96, p. 60*

★★ **Adobe Acrobat 2.0 (2.1),** Adobe Systems, 415/961-4400, $195. The font fidelity of this portable-document software is uneven. *Mar 95, p. 59*

★★★ **Adobe Acrobat for Workgroups 2.0 (2.1),** Adobe Systems, 415/961-4400, $1595. Portable-document software for workgroups is inexpensive but resource-intensive. *Mar 95, p. 59*

★★★★ **ArcView 2.1,** Environmental Systems Research Institute, 909/793-2853, ext. 2050, $995. Sophisticated GIS program is easy to customize. *Jan 96, p. 55*

★★★★ **BizPlan Builder 5.0,** Jian, 415/254-5600, $129. Easy-to-use spreadsheet/word processor template can be used to create business plans. *Jun 95, p. 61*

★★★ **Business Plan Writer 6.0,** Graphite Software, 301/984-1100, $99. Proposal-writing template helps you create a detailed business plan. *Jun 95, p. 61*

★★★★★/9.7 **Data Desk 5.0,** Data Description, 607/257-1000, $625. Classic statistics program adds dazzling new features. *Mar 96, p. 79*

★★★★★ **DeltaGraph Pro 3.5,** DeltaPoint, 408/648-4000, $195. Easy-to-use graphing software stands out from the pack. *Jan 96, p. 57*

★★★ **Equate 1.0,** Holosoft, 408/748-9648, $99. Newton spreadsheet is compatible with Excel. *Oct 95, p. 85*

★★★★/8.2 **FileMaker Pro 3.0,** Claris, 408/727-8227, $199. Database favorite goes relational, works the Web. *Apr 96, p. 56*

★★★★ **Helix Express 3.03,** Helix Technologies, 708/465-0242, $589. Latest release of visually oriented database adds speed and features. *Sep 95, p. 65*

★★★★ **MapInfo 3.0,** MapInfo, 518/285-6000, $1295. Mapping software includes advanced geographic-analysis and geocoding tools. *Oct 95, p. 66*

★★/4.4 **MapLinx 3.0,** MapLinx, 214/231-1400, $149.95. Useful tool if you only need to see where your customers are located. *Apr 96, p. 82*

★★★ **Meeting Maker XP 3.1,** On Technology, 617/374-1400, $249; $890 for 10 users. Group scheduling program is useful for small and midsize businesses. *Jan 96, p. 69*

★★★★ **Microsoft Excel 5.0,** Microsoft, 206/882-8080, $339. A wealth of powerful features but huge hardware requirements. *Jan 95, p. 54*

★★★★ **Microsoft FoxPro for Macintosh 2.5 (2.6),** Microsoft, 206/882-8080, $495. The relational database offers fast searching but an uneven interface for users. *Apr 94, p. 56*

★★★ **PhoneDisc 95 PowerFinder,** Digital Directory Assistance, 617/639-2900, $249. CD-ROM–based phone directory is convenient, but must be updated periodically. *Oct 95, p. 91*

★★★ **Phyla 1.0.3,** Mainstay, 805/484-9400, $495. While nonprogrammers can learn to use this object-oriented database, a little SmallTalk or C++ programming background would make it a bit easier. *Aug 95, p. 85*

★★★ **QuickFigure Pro 2.1,** PelicanWare, 503/221-1148, $49.95. Newton spreadsheet includes charting and linear equation solving among its features. *Oct 95, p. 85*

COMMUNICATIONS/NETWORKS

★★★★ **Apple Mobile Message System,** Apple Computer, 408/996-1010, $549; $19.95 per month. Multifaceted remote-messaging service helps you keep in touch. *Sep 95, p. 74*

★★★★ **ASAP 1.5,** MicroBeam, 813/546-2727, $695; $795 with Windows client program. Convenient utility makes file-transfer operations quick and easy. *Sep 95, p. 72*

★★★ **Claris Emailer 1.0,** Claris, 408/727-8227, $89. E-mail–management program offers impressive features at a good price. *Dec 95, p. 62*

★★★★/8.0 **CommuniGate 1.0,** Stalker Software, 415/383-7164, free for 5 users; 25 users $200; unlimited users $600; gateway modules $100 each. CommuniGate lets you send mail, faxes, print jobs, and electronic pages. *Apr 96, p. 63*

★★/4.6 **COPSTalk for Windows 1.2f,** CoOperative Printing Solutions, 770/840-0810, $179 per user. Windows 95–compatible software gives PCs AppleTalk capability. *Mar 96, p. 67*

★★★ **CreativePartner,** emotion Inc., 415/812-9000, $1500. Collaboration tool distributes video, sound, text, and graphics over a network. *Jul 95, p. 69*

★★★★ **FileWave 2.1.2,** Wave Research, 510/704-3900, $895. Update LAN users with this easy-to-use software-distribution tool. *Jul 95, p. 63*

★★★ **GrabNet 1.0,** ForeFront Group, 713/961-1101, $19.95. Simple, affordable utility captures Web pages. *Nov 95, p. 85*

★/1.4 **httpd4Mac 13b,** Bill Melotti, free. Minimalist freeware: feature-poor and unreliable Mac Web server. *Apr 96, p. 86*

★★★/5.2 **InterServer Publisher 1.0.1,** Intercon, 703/709-5500, $795. Fast and functional, but missing key features and documentation. *Apr 96, p. 86*

★★★★ **MacAdministrator,** Hi Resolution, 508/463-6956, $395 (10-user pack). Group administration tool is a great helper for network administrators. *Dec 95, p. 75*

★★/4.0 **MacHTTP 2.2,** Quarterdeck/StarNine, 510/649-4949, $95. Capable Mac Web server shareware but unreliable under heavy load. *Apr 96, p. 86*

★★★/6.3 **MachTen 4.0,** Tenon, 805/963-6983, $695. Fast but hard to use, requiring Unix administration skills. *Apr 96, p. 86*

★★★/5.0 **MailKeeper 1.0.2,** Nisus Software, 619/481-1477, $35. Quick online information database could be more convenient. *Apr 96, p. 70*

★★★★ **Netscape Navigator,** Netscape Communications, 415/528-2555, $39. Web browser is ahead of the pack in terms of features and ease of use.

continues

Star Ratings

May 95, p. 69. **Editors' Choice** for best Internet browser. *Oct 95, p. 110*

★★★/6.9 **PageMill 1.0,** Adobe Systems, 415/961-4400, $149. Drag-and-drop Web publishing software masks HTML complexities. *Mar 96, p. 56*

★★★★/8.8 **PageNow 1.5,** Mark/Space Softworks, 408/293-7299, $119. Alphanumeric paging software gets the message across. *Mar 96, p. 70*

★★★/5.8 **Personal MacLAN Connect 5.51,** Miramar Systems, 805/966-2432, $199 per user. Windows 95–compatible software lets PC and Mac users communicate via AppleTalk. *Mar 96, p. 67*

★★★★ **ProTerm Mac 1.0,** InTrec Software, 602/992-5515, $129.95. Communications program is fast, reliable, and stable. *Jul 95, p. 71*

★★★ **QuickMail 3.0 (3.5),** CE Software, 515/221-1801, $199 to $3799. Good choice for most people, though rule-based features are incomplete. *Jan 95, p. 59*

★★★ **Saber LAN Workstation,** Saber Software, 214/361-8086, $199 plus $49 per node. LAN-management package is a useful tool for the price. *Aug 95, p. 73*

★★★★ **Skyline/Satellite,** AG Group, 510/937-7900, 1-station pack $795; 5-station pack $1195; 10-station pack $1995. Remote monitoring engines keep an eye on LAN traffic. *Sep 95, p. 74*

★★★ **SnapMail 2,** Casady & Greene, 408/484-9228, $250 (5 users); $420 (10 users); $1940 (50 users). E-mail software is easy to install, but its gateway interface is kludgy. *Dec 95, p. 75*

★★★★ **Snatcher 1.0,** Software Ventures, 510/644-3232, $49.95. Simple, efficient FTP tool lets you connect to multiple sites simultaneously. *Aug 95, p. 81*

★★ **TurboTalk 1.0,** Information Presentation Technologies, 805/541-3000, $160 to $495. Network utility's performance is unimpressive on some network configurations. *Oct 95, p. 83*

★★★★/7.3 **WebStar 1.2.1,** Quarterdeck/StarNine, 510/649-4949, $795. Polished, capable, reliable, easy to use, and reasonably fast Mac Web server. *Apr 96, p. 86.* **Editors' Choice** for best Web server software.

DESKTOP PUBLISHING

★★★★ **Adobe PageMaker 6.0,** Adobe Systems, 206/622-5500, $895. Page-layout program's upgrade includes practical and powerful improvements. *Nov 95, p. 60*

★★★ **ColorDrive 1.0,** Pantone, 201/935-5500, $199. Color-management software supports a broad range of color models. *Nov 95, p. 70*

★★★★/7.2 **FontMonger 1.5.7,** Ares Software, 415/578-9090, $149.95. Easy font modifications, from redrawing characters to converting font formats. *Apr 96, p. 102*

★★★★ **FrameMaker 5.0,** Adobe Systems, 408/975-6000, $895. Page-layout program is a good choice for technical-document creation. *Nov 95, p. 63*

★ **HoTMetal Pro 2.0,** SoftQuad, 416/239-4801, $195. Web authoring software is hampered by a poorly designed interface. *Jan 96, p. 65*

★★★★ **Icefields 2.3,** The Color Partnership, 619/259-8688, $895. Professional printers will appreciate this stochastic-screening software. *Nov 95, p. 75*

★★★★ **QuarkXPress 3.2 (3.31),** Quark, 303/894-8888, $895 ($995 for Power Macintosh). A must-have layout tool for color publishers. *Nov 93, p. 51*

★★★★/7.4 **theTypeBook 4.02b,** Rascal Software, 805/255-6823, $49.95. Creates font reference books from ready-to-print specimen pages. *Apr 96, p. 102*

EDUCATION/ENTERTAINMENT

★★★★ **3D Atlas 1.1,** EA World, 415/571-7171, $79.95. Well-designed atlas enriches map data with narration, photos, and movies. *May 95, p. 73*

★★★ **AmoebArena 1.0,** Casady & Greene, 408/484-9228, $49.95. Engaging strategy game pits amoeboid against amoeboid. *Jan 96, p. 75*

★★★★/8.6 **The Cartoon Guide to Physics,** HarperCollins Interactive, 212/207-7000, $49.95. Entertaining introduction to basic kinematics. *Apr 96, p. 78*

★★★★ **The Daedalus Encounter,** Virgin Interactive Entertainment, 714/833-8710, $59.95. Escape from a doomed spacecraft in this interactive adventure. *Sep 95, p. 73*

★★★★/8.5 **Descent 1.0,** MacPlay, 714/553-3530, $49.95. Which way is up? 360-degree 3-D maneuverability will leave you spinning. *Apr 96, p. 72*

★★★ **Digital Chisel 1.2,** Pierian Spring Software, 503/222-2044, $199.95, site license $995. Authoring tool creates good interactive quizzes but suffers from a nonstandard interface. *Jun 95, p. 71*

★★★ **FrenchNow 3.0,** Transparent Language, 603/465-2230, $99 to $129. While it doesn't replace a class, software can help you learn French. *Dec 95, p. 83*

★★★★ **Full Throttle,** LucasArts, 415/472-3400, $49.95. Biker adventure game is witty and action-packed. *Jan 96, p. 73*

★★ **Haight-Ashbury in the Sixties,** Compton's NewMedia, 619/939-2500, $49.95. If you can remember the sixties, you probably don't need this CD-ROM. *Dec 95, p. 84*

★★★★/8.8 **In the 1st Degree,** Brøderbund, 415/382-4700, $49.95. Realistic, interactive legal thriller. *Apr 96, p. 80*

★★★ **King's Quest VII: The Princeless Bride,** Sierra Online, 206/649-9800, $59.95. Adventure game is entertaining, but adults might find its plot silly. *Jan 96, p. 75*

★★★ **The Legend of Kyrandia, Book 3,** Virgin Interactive Entertainment, 714/833-1999, $34.95. Enjoyable adventure game features good graphics and sound. *Jan 96, p. 77*

★★★★ **Links Pro CD,** Access Software, 801/359-2900, $69.95. An excellent simulation of golf's many challenges. *Jan 96, p. 73*

★★★★ **The Lost Mind of Dr. Brain,** Sierra On-Line, 206/649-9800, $44.95. Hilarious brainteasers are presented in an imaginative, arcade style. *Oct 95, p. 93*

★★★★/8.5 **Marathon 2: Durandal,** Bungie Software Products, 312/563-6200, $79. A well-crafted action-adventure game, but it's not for the squeamish or those disturbed by violence. *Mar 96, p. 85*

★★★★ **Material World,** StarPress Multimedia, 415/274-8383, $59.95. Multimedia CD-ROM provides a fascinating look at diverse cultures. *Jun 95, p. 83*

★★★★ **Math Workshop,** Brøderbund Software, 415/382-4700, $40. Youngsters can have some fun while learning math. *Aug 95, p. 89*

★★ **Merriam-Webster's Collegiate Dictionary on CD-ROM,** Merriam-Webster, 413/734-3134, $69.95. Powerful search capabilities don't make up for this dictionary's interface flaws. *Nov 95, p. 79*

★★★★ **Nile: Passage to Egypt,** Discovery Channel Multimedia, 301/986-1999, $49.95. Armchair adventurers will enjoy this multimedia journey on CD-ROM. *Oct 95, p. 93*

★★★ **Out of the Sun,** Domark software, 415/513-8929, $44.95. Flight-simulation game presents historic and custom battle scenarios. *Jan 96, p. 77*

★★★★★ **Passage to Vietnam,** Against All Odds Productions/Interval, 800/558-3388, dept. 100, $39.95 to $59.95. Stunning photojournalism CD-ROM sets a new standard for multimedia projects. *Dec 95, p. 83*

★★★ **Small Blue Planet 2.0 (2.0.1),** Now What? Software, 415/885-1689, $59.95. The satellite photos of this atlas are truly dazzling, although the interface is less than world class. *May 95, p. 73*

★★★★ **Storybook Weaver Deluxe 1.0,** MECC, 612/569-1500, $69.95. Well-designed program lets kids create their own storybooks. *May 95, p. 83*

★★★★ **Theorist 2.0,** Waterloo Maple Software, 519/747-2373, $299. Symbolic-math program is a great learning aid for students. *Jun 95, p. 79*

★★★★/8.9 **You Don't Know Jack,** Berkeley Systems, 510/540-5535, $30. "Jeopardy!" with a bad attitude. *Mar 96, p. 85*

FINANCE/ACCOUNTING

★★★★/7.1 **Kiplinger TaxCut 1995,** Block Financial Software, 816/751-6000, $39.95; state modules $24.95. Easy-to-use interface and elegant organization, but lacks a state version. *Apr 96, p. 66*

★★★★/8.6 **MacInTax Deluxe 1995,** Intuit, 520/295-3110, $49.95; state modules $25. Not only guides you effortlessly through your return, but also gives helpful financial planning advice. *Apr 96, p. 66*

★★★★ **Managing Your Money 7.0,** MECA Software, 203/255-1441, $79.95. Personal financial software includes advanced investment features. *Oct 95, p. 81*

★★★★ **M.Y.O.B. 5.0,** BestWare, 201/586-2200, $139 ($239 with payroll). Well-designed interface makes double-entry accounting easy. *May 95, p. 63*

★★★/5.2 **Personal Tax Edge 1995,** Parsons Technology, 319/395-9626, $19; state modules $19. Produces high-quality printed forms but has DOS-inspired interface. *Apr 96, p. 66*

★★★ **QuickBooks 3.0,** Intuit, 415/322-0573, $119. Double-entry accounting program is easy to use but not entirely Mac-like. *Jun 95, p. 58*

★★★★/8.3 **Quicken Deluxe 6,** Intuit, 520/295-3220, $59.99. The best-selling package gets bigger and mostly better. *Feb 96, p. 65*

GRAPHICS

★★★ **AddDepth 2.0,** Ray Dream, 415/960-0768, $99. 3-D effects software provides a simple way to give depth to illustrations. *Nov 95, p. 81*

★★★★/8.4 **Adobe After Effects 3.0,** Adobe Systems, 415/961-4400, $995 base version; $1995 Production Bundle. Must-have video-design package enhances motion control and adds effects. *Mar 96, p. 54*

★★★★/7.1 **Adobe Illustrator 6.0,** Adobe Systems, 415/961-4400, $595. Don't let the version number fool you: this is a minor upgrade. Its minor tweaks aren't enough to make it surpass FreeHand 5.5. *Apr 96, p. 54*

★★★/6.3 **Adobe PhotoDeluxe 1.0,** Adobe Systems, 415/961-4400, $129. "Photoshop Lite" makes questionable compromises in order to appeal to consumer market. *Apr 96, p. 59*

★★★★ **Adobe Photoshop 3.0 (3.0.4),** Adobe Sys-

tems, 415/961-4400, $895. Broader capabilities combine with simplified work environment. *Jan 95, p. 52.* **Editors' Choice** for best image editor. *Feb 95, p. 112*

★★★★/7.4 **Adobe Premiere 4.2,** Adobe Systems, 415/961-4400, $795. Video editor offers significant enhancements, including CD-ROM Movie Maker plug-in. *Mar 96, p. 90*

★★★ **Adobe TextureMaker 1.0 (2.0),** Adobe Systems, 415/961-4400, $199. Texture generator creates backgrounds for multimedia or printed projects. *Oct 95, p. 89*

★★★ **Alien Skin Textureshop 1.0,** Virtus, 919/467-9700, $99. Apply random mutations to master textures to create custom patterns. *Jul 95, p. 81*

★★★ **Black Box 2.0,** Alien Skin Software, 919/832-4124, $119. Photoshop image filters are useful and worth their modest price. *Nov 95, p. 87*

★★★/6.9 **Boris Effects 1.01,** Artel Software, 617/566-0870, Premiere version $350; Media 100 version $695. Plug-in for Premiere and Media 100 adds video-effects control. *Feb 96, p. 85*

★★★ **Canvas 3.5 (3.5.2),** Deneba Software, 305/596-5644, $399. Lots of features but confusing interface. *Jan 94, p. 49*

★★★ **CD-Q 2.0,** Human Software Company, 408/741-5101, $145. Photoshop plug-in facilitates color corrections and separations on Photo CDs. *Jul 95, p. 65*

★/1.5 **Chagall 2.0.2,** Technosystems USA, 502/351-0108, $299. Image-editing application flunks test. *Feb 96, p. 78*

★★★★/8.0 **Claris Impact 2.0,** Claris, 408/987-7000, $99. Easy and affordable business-graphics software. *Feb 96, p. 66*

★★★★ **Color It 3.0,** MicroFrontier, 515/270-8109, $149.95. Venerable paint program has been updated with powerful new features. *Aug 95, p. 75*

★★★ **Colorize 2.0,** DS Design, 919/319-1770, $495. Colorizing software is effective, but expensive for a one-trick pony. *Dec 95, p. 81*

★★★★/7.5 **Dabbler 2,** Fractal Design, 408/688-5300, $69. Drawing package offers an easy, affordable natural painting option. *Mar 96, p. 63*

★★★★/7.3 **DrawTools 1.0,** Extensis, 503/274-2020, $149. Extensions add color, shape, and object tools to FreeHand and Illustrator. *Feb 96, p. 71*

★★/4.5 **Envelopes 1.0,** Letraset USA, 800/343-8973, $99. Distorts objects but inserts extraneous anchor points as well. *Mar 96, p. 106*

★★ **FloorPlan Plus 1.1,** ComputerEasy International, 602/829-9614, $49.95. Affordable 2-D CAD program is intended for rudimentary design tasks. *Sep 95, p. 85*

★★★ **FullPixelSearch 1.5,** Avian Systems, 201/224-2025, $1295. Analyze scientific images with a variety of pixel-selection functions. *Jul 95, p. 79*

★★★ **Gryphon Batch It 1.0,** Gryphon Software, 619/536-8815, $199. Although it lacks conditional statements, batch processor is a time-saver. *Jun 95, p. 67*

★★★★ **Infini-D 3.0,** Specular International, 413/253-3100, $899. 3-D software does professional-quality rendering and animation. *Jan 96, p. 54*

★★/3.3 **Infinite FX 1.0,** BeInfinite, 404/552-6624, $149. Many automated reshaping effects, mired by poor organization. *Mar 96, p. 106*

★★★ **Intellihance 1.0,** DPA Software, 214/517-6876, $129 to $299. Photoshop plug-in automates the process of improving scanned graphics. *Sep 95, p. 71*

★★★★/8.3 **Kai's Power Tools 3.0,** MetaTools, 805/566-6200, $199. More-powerful plug-ins, more-baffling interface. *Feb 96, p. 57*

★★★★ **KPT Convolver 1.0,** MetaTools, 805/566-6200, $199. Imaginative and absorbing plug-in module creates Photoshop filters. *Aug 95, p. 71*

★★★★/8.9 **KPT Final Effects 3.0,** MetaTools, 805/566-6200, $695. Superb effects library for Adobe After Effects. *Apr 96, p. 69*

★★★★/8.5 **KPT Vector Effects 1.0,** MetaTools, 805/566-6200, $199. Combines excellent experimentation functions with thoughtful interface design. *Mar 96, p. 106.* **Editors' Choice** for best natural draw software.

★★★/6.2 **LightningDraw GX 1.0,** Lari Software, 919/968-0701, $299. Lets you combine colors and shapes and experiment with QuickDraw GX fonts. *Mar 96, p. 106*

★★★★ **Live Picture 2.0,** HSC Software, 805/566-6200, $995. Latest version of this innovative image editor boasts many improvements. *Sep 95, p. 62*

★★★★ **MacPhase 2.0,** The Otter Solution, 315/768-3956, $279. Feature-rich program offers scientific and graphics image processing tools. *Aug 95, p. 85*

★★★★/8.1 **Macromedia FreeHand 5.5,** Macromedia, 415/252-2000, $595. Draw program outperforms competitor, for now. *Feb 96, p. 74*

★★★★/8.1 **MiniCad 6,** Graphsoft, 410/290-5114, $795. Nothing's small about this modular package. *Mar 96, p. 65*

★★★ **MovieFlo' 1.1,** The Valis Group, 415/435-5404, $899. Tug, twist, and pinch images with this special-effects program. *Jun 95, p. 60*

★★★★ **Paint Alchemy 2.0,** Xaos Tools, 415/487-7000, $199. Flexible image editor is an appealing add-on for digital artists. *Sep 95, p. 70*

★★★★★/9.4 **Painter 4,** Fractal Design, 408/688-5300, $549. Near-perfect painting program just got even better. *Mar 96, p. 58*

★★★ **PhotoFix 2.8.8,** Microspot USA, 408/253-2000, $249. Image-editing/photo-enhancement program is a useful tool. *Sep 95, p. 81*

★★★ **PhotoFlash 2.0,** Apple Computer, 408/996-1010, $129. Image-editing utility provides basic image-retouching tools at a reasonable price. *Jul 95, p. 67*

★★ **PhotoFusion 2.0.3,** Ultimate, 818/993-8007, $695. Photoshop compositing plug-in is hampered by a poor interface. *Oct 95, p. 83*

★★★ **PixelPutty Solo (1.5),** The Valis Group, 415/435-5404, $399. Affordable modeler lets you manipulate 3-D objects as if they were clay. *Jun 95, p. 77*

★★★★ **Poser 1.0,** Fractal Design, 408/668-5300, $199. 3-D illustration tool generates posable human figures. *Oct 95, p. 63*

★★★★ **PowerCADD 2.0,** Engineered Software, 910/299-4843, $795. CAD program features exceptional speed and an extensive array of tools. *Oct 95, p. 77*

★★★★/7.2 **QX-Tools 1.0,** Extensis, 503/274-2020, $149. Ten XTensions that make QuarkXPress more powerful. *Feb 96, p. 73*

★★★ **Ray Dream Designer 3.1.1,** Ray Dream, 415/960-0768, $349. 3-D graphics program provides competent modeling tools and excellent rendering. *Mar 95, p. 61*

★★ **Select 1.6,** Human Software, 408/741-5101, $245. CMYK color-correction plug-in duplicates many Photoshop functions. *Jul 95, p. 81*

★★★★/8.7 **SmartSketch 1.0,** FutureWave Software, 619/637-6190, $69.95. Makes drawing and editing paths as easy as painting. *Mar 96, p. 106.* **Editors' Choice** for best natural draw programs.

★★★/6.5 **theFONDler 4.0.1,** Rascal Software, 805/255-6823, $69.95. Font utility diagnoses problems. *Apr 96, p. 84*

★★★/5.0 **Tracer 1.0,** ScanVec, 508/694-9488, $795. Excellent but expensive autotracing. *Feb 96, p. 85*

★★★★ **Transverter Pro 3.0,** TechPool Studios, 216/382-1234, $395. Graphics-conversion tool deserves a place in every desktop publisher's toolbox. *Nov 95, p. 77*

★★★★/8.7 **upFront 2.0.1,** SketchTech, 612/379-1435, $299. A new vendor—SketchTech—improves Alias's venerable entry-level 3-D modeling package. *Mar 96, p. 86*

★★★★ **Vision 3d 4.0,** Strata, 801/628-5218, $695. 3-D modeling, rendering, and animation package offers excellent tools. *Jul 95, p. 56*

★★★ **Working Model,** Visual Basic, 415/574-7777, $2495. Motion-simulation system is a fine product, but a Power Mac version is needed. *Dec 95, p. 79*

★★ **xRes 1.11,** Fauve Software, 415/543-7178, $799. Image editor applies a variety of effects to selected areas of a large composition. *Jul 95, p. 60*

MATH/SCIENCE

★★★★ **The Fuzzy Logic Toolbox 1.0,** MathWorks, 508/653-1415, $895. Math-simulation aid incorporates fuzzy logic into models. *Sep 95, p. 89*

★★★★/7.5 **Igor Pro 2.0.4,** WaveMetrics, 503/620-3001, $495. Top-notch scientific graphing package. *Feb 96, p. 90*

★★★★ **LabView 3.1,** National Instruments, 512/794-0100, $1995. Instrumentation software can emulate most scientific and electronic test-bench instruments. *Nov 95, p. 62*

★★★★/7.4 **Spreadware Statistics Menu 4.0,** Spreadware, 619/772-1758, $229. Excel users can put Spreadware's statistics to work in minutes. *Apr 96, p. 72*

★★★★/7.1 **SPSS 6.1,** SPSS, 312/329-2400, $695; modules $395 to $495. Mainframe statistics giant has new Mac interface. *Feb 96, p. 82*

★★★★/8.3 **StatView 4.5,** Abacus Concepts, 510/540-1949, $595. Statistics and graphing package. *Feb 96, p. 81*

ORGANIZATION/PRODUCTIVITY

★★★★ **ClarisWorks 4.0,** Claris, 408/727-8227, $129. Integrated program's word processor and database are superb. *Oct 95, p. 62.* **Editors' Choice** for best integrated software. *Nov 95, p. 124*

★★ **ClienTrac 2.0,** Whiskey Hill Software, 415/851-8702, $99. PIM is easy to use but slim on speed, features, and flexibility. *May 95, p. 75*

★★/3.7 **Day-Timer Organizer 2.0,** Day-Timer Technologies, 415/572-6260, $59.95. PIM has some rough edges. *Mar 96, p. 92*

★★★ **FastTrack Schedule 3.0,** AEC Software, 703/450-1980, $299. Updated version of this project planner includes customizable features. *Aug 95, p. 79*

★★★★ **In Control for Workgroups 3.5,** Attain, 617/776-1110, $149.95; 10-pack $949.95. Flexible project planner/scheduler combines an outliner and a calendar. *Sep 95, p. 93*

★★★ **InfoGenie 1.0.5,** Casady & Greene, 408/484-9228, $79.95. Free-form data manager is appealing but lacks some of the competition's features. *Nov 95, p. 87*

★★★ **InTouch 2.5,** Prairie Group, 515/225-3720,

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Star Ratings

$69.95. Free-form contact manager offers speedy access to information. *Sep 95, p. 69*

★★★ **Microsoft Works 4.0,** Microsoft, 206/882-8080, $99.95. Good word processing and drawing tools; poor spreadsheet and database modules. *Jan 95, p. 63*

★★★★ **Now Up-to-Date and Contact 3.5,** Now Software, 503/274-2800, $99. Calendar/address book combo features several enhancements. *Nov 95, p. 68*

★★ **Peanuts Family Organizer 1.0,** Individual Software, 510/734-6767, $19.95. Organizer's endearing interface doesn't make up for missing features.. *Jun 95, p. 81*

PRESENTATION TOOLS

★★★★ **Adobe Premiere 4.0 (4.0.1),** Adobe Systems, 415/961-4400, $795. Advances far and above its competitors with professional-level features. *Dec 94, p. 54*

★★★★/7.1 **Astound 2.0,** Gold Disk, 408/982-0200, $249. Presentation graphics with a multimedia twist. *Mar 96, p. 73*

★★★★ **Authorware Professional 3.0,** Macromedia, 415/252-2000, $4995. Multimedia authoring program is feature-packed but costly. *Dec 95, p. 66*

★★★ **CyberSound FX 1.0,** InVision Interactive, 415/812-7380, $129. Plug-ins for Premiere make audio more polished, but access is cumbersome. *Nov 95, p. 91*

★★★ **Electronic Marker 1.0.2,** Consumer Technology Northwest, 503/643-1662, $34.95. Annotation tool can enhance demonstrations but needs better layer tools. *May 95, p. 71*

★★★ **HyperCard 2.3,** Apple Computer, 408/996-1010, $129. Authoring tool is an inexpensive solution for multimedia developers. *Nov 95, p. 66*

★★ **Living Album 2.5,** QuickMedia Labs, 408/749-9200, $129.95. Multimedia album is hampered by a crowded interface. *May 95, p. 81*

★ **MediaFactory 1.0,** Nuts Technologies, 408/980-7800, $199. Entry-level QuickTime movie editor has an awkward interface. *Nov 95, p. 89*

★★/3.5 **Mediagnügen 1.0.1,** Gnügen Software, 303/682-5380, $29.98. Almost useless as a serious browser; lets you view and copy collections of images, but not organize and sort them. *Apr 96, p. 67*

★★★★ **MediaPaint 1.0,** Strata, 801/628-5218, $695. QuickTime paint program lets multimedia developers edit ranges of frames. *Sep 95, p. 56*

★★★ **Microsoft PowerPoint 4.0,** Microsoft, 206/882-8080, $339. Presentation-graphics program is a good choice to use along with Word or Excel. *Feb 95, p. 67*

★★★/6.5 **Movie Cleaner Pro 1.1.1,** Terran Interactive, 408/353-8859, $129. QuickTime-compression utility for crisp CD-ROM movies. *Apr 96, p. 69*

★★★★ **Persuasion 3.0,** Adobe Systems, 206/622-5500, $495. Extensive charting options and hypertext options are key additions. *Sep 94, p. 65*

★★★★ **Presenter Professional 3.0,** VIDI, 818/358-3936, $1995. 3-D modeling/animation package is an excellent choice for multimedia producers. *May 95, p. 59*

★★/4.0 **ProView 1.1,** E-magine, 818/881-4757, $69.95 Adequate tool for assembling an electronic portfolio or online manual. *Apr 96, p. 67*

★★/4.9 **STiP Professional 2.1,** MacVonk, 403/232-6545, $1295. Multimedia authoring program is promising but flawed. *Apr 96, p. 75*

★★★★ **TransJammer,** Elastic Reality, 608/273-6585, $99. Plug-in for Premiere and VideoShop offers 100 video-transition effects. *Aug 95, p. 83*

PROGRAMMING

★★★★ **AppWare 1.2,** Novell, 801/429-7000, $495. Development system features an easy-to-use graphical programming method. *Oct 95, p. 68*

★★★★/8.4 **CodeWarrior Gold 7,** Metrowerks, 512/305-0400, $399. Key Power Mac compiler gets yet another face-lift. *Mar 96, p. 69*

★★★★ **FaceSpan 2.0,** Software Designs Unlimited, 214/578-6700, $199. AppleScript interface builder lets developers create sophisticated applications. *Nov 95, p. 64*

★★★★ **JAM 6,** JYACC, 212/267-7722, $2000. Development tools enable creation of large-scale corporate client-server databases. *Oct 95, p. 70*

★★★★/8.0 **LS FORTRAN 1.1,** Fortner Research, 703/478-0181, $695. FORTRAN rides again, running science programs on the Power Mac desktop. *Feb 96, p. 95*

★★★ **Script Debugger 1.0,** Late Night Software, 604/929-5578, $129. Script-development software improves on AppleScript, except in the debugging department. *Nov 95, p. 85*

★★★★/8.4 **Scripter 1.0.1,** Main Event Software, 202/298-9595, $199. AppleScript development system offers serious debugging power. *Mar 96, p. 88*

★★★ **Symantec C++ 8.0,** Symantec, 503/334-6054, $499. Compiler has been improved and expanded but demands lots of resources. *Jul 95, p. 62*

★★★★/7.0 **Tools Plus 2.6,** Water's Edge Software, 416/219-5628, For Symantec's C/C++ and Pascal $149 each; for both $199; for CodeWarrior Bronze $199; for CodeWarrior Gold $249. Programmers' tool kit saves time. *Feb 96, p. 92*

UTILITIES

★★★★/7.3 **Adobe Fetch 1.2,** Adobe Systems, 415/961-4400, $149. Catalog graphics, text, and more for easy organization and retrieval. *Apr 96, p. 102*

★★ **Adobe ScreenReady 1.0,** Adobe Systems, 415/961-4400, $199. PostScript image rasterizer can aid multimedia developers but has some flaws. *Dec 95, p. 71*

★★★★/8.7 **Adobe Type Manager 3.9,** Adobe Systems, 415/961-4400, $39.95. Accurately renders PostScript fonts at all sizes onscreen and on any printer. *Apr 96, p. 102*

★★★ **Aladdin Desktop Tools 1.0,** Aladdin Systems, 408/761-6200, $89.95. Utilities collection is uneven but a worthwhile buy. *Aug 95, p. 69*

★★★★/7.3 **AliasZoo 2.0.5,** Blue Globe Software, shareware, $15. Locates and fixes orphaned aliases and deletes unneeded ones. *Apr 96, p. 102*

★★★ **Arcserve for Macintosh 1.5,** Cheyenne Software, 516/484-5110, $245 (5 users); $495 (20 users). A good backup program for mixed-platform networks. *Jan 96, p. 63*

★★★★★/9.3 **AreaCodeFinder 4.0,** John Calande, shareware, $15. Identifies the location (and time zone) of an area code and vice versa. *Apr 96, p. 102*

★★★/6.2 **At Ease 3.0,** Claris, 408/727-8227, $46. This desktop alternative lets you share your Mac and worry less. *Feb 96, p. 81*

★★★★ **At Ease 3.0 for Workgroups,** Apple Computer, 408/996-1010, $295. Desktop alternative is a handy tool for network administrators. *Nov 95, p. 83*

★★★★ **BeyondPress 1.0,** Astrobyte LC, 303/534-6344, $595. QuarkXPress XTension is a great way to convert documents to Web pages. *Dec 95, p. 73*

★★★★/7.3 **Calc+ 2.0,** Abbott Systems, 914/747-4201, $29. Simple calculator with a resizable, scrollable, editable, printable tape. *Apr 96, p. 102*

★★★ **CanOpener 3.0,** Abbott Systems, 914/747-4171, $125. Utility opens many types of files but falls short in file-search department. *May 95, p. 67*

★★★★ **CD Directory 1.0,** Insignia Solutions, 415/694-7600, $69.95. Utility stores catalogs of CD directories on a hard drive. *Jul 95, p. 73*

★★★/6.9 **Claris Emailer 1.0v2,** Claris, 408/987-7000, $89. One-stop E-mail sending, receiving, and storing, plus a single all-encompassing address book. *Apr 96, p. 102*

★★★ **Color Compass 1.0,** Praxisoft, 703/729-3391, $129. Speedy, specialized tools blend, match, and tweak colors. *Aug 95, p. 77*

★★★★★/9.4 **Conflict Catcher 3.0.2,** Casady & Greene, 408/484-9228, $99.95. Pretty near perfect, and pretty near essential, start-up file manager. *Apr 96, p. 102*

★★★★/7.6 **DeBabelizer 1.6.5,** Equilibrium Technologies, 415/332-4343, $399. Endlessly talented and exasperating batch processor for bitmap graphics. *Apr 96, p. 102*

★★★★/8.6 **Desktop Dialer 1.4.2,** Sophisticated Circuits, 206/485-7979, $75. Dials phone numbers appearing in any document. *Apr 96, p. 102*

★★★★ **Disc-To-Disk,** Optical Media International, 408/376-3511, $199. Audio-capture utility is a useful tool for multimedia authors. *Jun 95, p. 69*

★★★★/7.8 **DiskExpress II 2.20,** Alsoft, 713/353-4090, $89.95. Intelligently defragments hard drives for optimum drive performance. *Apr 96, p. 102*

★★★/6.8 **DOS Mounter 95 1.0,** Software Architects, 206/487-0122, $100. Windows-to-Mac file-transfer utility gets Win 95–savvy. *Mar 96, p. 74*

★★★★/8.1 **DragStrip 2.0,** Natural Intelligence, 617/876-7680, $59.95. Feature-packed file launcher well worth the premium price. *Apr 96, p. 102*

★★★ **File Genie Pro 1.1,** Duet Development, 408/559-3838, $89. Disk- and file-management utility is fast but has limited search and sort criteria. *Oct 95, p. 87*

★★★★ **FolderBolt Pro 1.0.3,** Kent Marsh, 713/522-5625, $129.95. Top-notch encryption schemes secure your Mac's contents. *Jul 95, p. 77*

★★★ **Gear 2.5,** Elektroson, 610/617-0850, $799. CD-recordable mastering software is a mixed bag. *Sep 95, p. 91*

★★★/6.7 **GrabNet 2.0,** ForeFront Group, 713/961-1101, $19.95. Bookmark manager for Netscape Navigator grabs Web graphics and text. *Apr 96, p. 102*

★★★★ **Graffiti 1.01,** Palm Computing, 415/949-9560, $79. Teach yourself a new writing system that Newton can handle. *May 95, p. 77*

★★★ **Here & Now 1.0,** Software Architects, 206/487-0122, $89.95. File-transfer utility facilitates putting a Mac disk in a PC. *Nov 95, p. 81*

★★★★ **InstantReplay 1.0,** Strata, 801/628-5218, $149. Utility records on-screen activity and saves it as a QuickTime movie. *Sep 95, p. 89*

★★★★/7.6 **MacLinkPlus/Translators Pro 8.06ia,** DataViz, 203/268-0030, $149. Excellent PC to Mac (or reverse) conversions for word processor, spreadsheet, or database documents. *Apr 96, p. 102*

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★★/4.5 **MacOpener 1.0,** DataViz, 203/268-0030, $75. Unintuitive Mac-to-Windows file-transfer utility. *Mar 96, p. 75*

★★★ **MacTools Pro 4.0,** Symantec, 503/690-8090, $149.95. This utility does a good job of diagnosing and fixing disk problems, but suffers from large RAM requirements and expensive tech support. *May 95, p. 73*

★★★ **Menu Master Mac,** Electronic Learning Systems, 904/375-0558, $99; 15-site license $299. Security software is useful but could use some additional features. *Sep 95, p. 95*

★★★ **Multimedia Utilities 1.1,** Motion Tool Works, 415/541-9333, $99.95. Six appealing utilities address QuickTime moviemaking but you should remember to save often. *Jul 95, p. 71*

★★★ **Norton Utilities for Macintosh 3.1,** Symantec, 503/334-6054, $149.95. Utilities suite features strong disk repair and data recovery but weak backup. *Feb 95, p. 63*

★★★★/7.6 **Now Utilities 5.0.2,** Now Software, 503/274-2899, $89.95. Diverse utilities collection with especially useful custom menu module. *Apr 96, p. 102*

★★★ **On Cue II Utilities 3.0,** ComputerEasy International, 602/829-9614, $99.95. Eight utilities add functionality to the Mac Operating System. *Sep 95, p. 93*

★★★★/7.1 **OptiMem RAM Charger 2.12,** Jump Development Group, 412/681-2692, $129. Increases RAM available for applications by allocating it more efficiently. *Apr 96, p. 102*

★★★★/8.3 **PopupFolder 2.0.1,** Inline Software, 617/938-8088, $79. Improves Finder navigation via ubiquitous pop-up menus. *Apr 96, p. 102*

★★★★ **Power Secretary Power Edition 2.0,** Articulate Systems, 617/935-5656, $2495. Speech-recognition program learns your voice patterns as you use it. *Sep 95, p. 60*

★★★★ **QuicKeys 3.0,** CE Software, 515/221-1801, $139. Easy-to-use shortcut manager. *Mar 94, p. 61*

★★★★/8.6 **RAM Doubler 1.6,** Connectix, 415/571-5100, $99. Fools your Mac into thinking it has twice the RAM it actually does. *Apr 96, p. 102*

★★★ **RapidCD 1.04,** Insignia Solutions, 415/694-7600, $69.95. Utility provides speedy access to frequently used data on CD-ROM. *Jul 95, p. 73*

★★★★/8.9 **Retrospect 3.0, Retrospect Remote 3.0,** Dantz Development, 510/253-3000, Retrospect $249; Retrospect Remote (10 users) $449. Backup programs now even more powerful, easier to use. *Apr 96, p. 61*

★★★★ **S/Link 2.0,** Synclavier, 603/448-8887, $249. Utility is a valuable aid for anyone who does audio file conversion. *Nov 95, p. 91*

★★★★/8.4 **SCSI Director Pro 4.0,** Transoft, 805/897-3350, $99.95. Hard disk formatting and testing utility. *Feb 96, p. 86*

★★★★/8.9 **Speed Doubler 1.0.2,** Connectix, 415/571-5100, $99. Connectix makes a Power Mac's 680X0 emulation feel native. *Feb 96, p. 56*

★★★★/7.9 **StuffIt Deluxe 3.5,** Aladdin Software, 408/761-6200, $129.95. Mac, PC, and Internet file compression and decompression. *Apr 96, p. 102*

★★★★/8.9 **SuperATM 3.9,** Adobe Systems, 415/961-4400, $69. ATM's PostScript font rendering plus intelligent substitution of missing fonts. *Apr 96, p. 102*

★★★★/7.2 **Transverter Pro 3.0.1,** TechPool Software, 216/291-1922, $399. Batch-process PostScript files or preview them to catch mistakes before printing. *Apr 96, p. 102*

★★★★/7.5 **TypeIt4Me 4.5.1,** Riccardo Ettore, shareware, $30. Automatically expands user-defined abbreviations in any application. *Apr 96, p. 102*

★★★★/8.5 **TypeTamer 1.1.1,** Impossible Software, 714/470-4800, $59.95. Every conceivable Font menu improvement in one well-designed program. *Apr 96, p. 102*

★★★ **ultraSecure 3.524,** usrEZ Software, 714/756-5140, $239. Security program offers a comprehensive set of protection tools. *Sep 95, p. 81*

★★★★ **Virex 5.5.1,** Datawatch, 508/988-9700, $99.95. Comprehensive, reliable, and speedy virus-detection utility helps protect files. *May 95, p. 65*

★★★ **Zonkers 1.0,** Nova Development, 818/591-9600, $19.95. Redecorate your Mac with a collection of silly desktop enhancements. *Aug 95, p. 89*

VERTICAL MARKETS

★★★ **ConcertWare 1.5.7,** Jump Software, 415/917-7460, $159. Music-notation program is affordable and easy to use, but lacks features. *Jun 95, p. 75*

★★★★ **FreeStyle 1.01,** Mark of the Unicorn, 617/576-2760, $200. Music sequencer with notation is a good choice for beginners. *Nov 95, p. 70*

★★★ **Insta Software,** Chang Labs, 408/727-8096, $29 per module. No-frills relational databases handle forms and record-keeping for businesses. *Aug 95, p. 77*

★★★★ **Nightingale 2.0,** TAP Music Systems, 206/462-1007, $495. Music-notation software is fast, feature-laden, and easy to learn. *Oct 95, p. 81*

★★★/6.9 **Quicken Family Lawyer 6.0b,** Parsons Technology, 319/395-9626, $49. Helps you prepare 61 legal documents. *Feb 96, p. 88*

★★★ **Route 66 1.5,** Route 66 Geographic Information Systems B.V., 415/957-0666, $79.95. Route planner is fast but omits some cities. *May 95, p. 65*

★★★ **StoryBoard Artist 1.5,** PowerProduction Software, 310/937-4411, $499. Storyboard-creation software is useful but expensive. *Oct 95, p. 91*

★★ **Visual Arranger 1.0,** Yamaha Corp. of America, 714/522-9240, $59.95. Song-building software is innovative, but replacing notation with icons doesn't work. *Nov 95, p. 89*

WRITING TOOLS

★★/3.0 **Indexicon 1.0,** Iconovex, 612/896-5100, $129. Word 6 indexing tool has trouble identifying indexable terms. *Apr 96, p. 77*

★★★ **Microsoft Word 6.0 (6.0.1),** Microsoft, 206/882-8080, $339. Word processor's many new features may benefit users with fast Macs. *Feb 95, p. 53.* **Editors' Choice** for best high-end word processor. *Mar 95, p. 106*

★★★ **Nisus Writer 4.0,** Nisus Software, 619/481-1477, $495. Word processor excels in specialized areas but has flawed table editor. *Mar 95, p. 53*

★★★★/7.1 **Spelling Coach Professional 4.1,** Deneba Software, 305/596-5644, $69.95. Adds dictionary and thesaurus to almost any application. *Mar 96, p. 80*

★★★ **Three by Five 2.0,** MacToolkit, 310/395-4242, $99. Idea organizer uses the metaphor of index cards on a corkboard. *Aug 95, p. 87*

★★★/6.7 **WordPerfect 3.5,** Novell Business Applications, 801/225-5000, $189. Popular word processor adds HTML editor. *Feb 96, p. 61*

hardware

INPUT DEVICES

★★★★ **ArtZ II,** Wacom Technology, 360/750-8882, $389.99. Graphics tablet has unique stylus that erases as well as draws. *Dec 95, p. 79*

★★★ **ChoiceStick 1.0.2,** Kernel Productions, 302/456-3026, $69.95. Port lets you attach a pair of joysticks to a Mac. *Sep 95, p. 85*

★★★/6.0 **Desktop GlidePoint,** Alps Electric, 408/432-6000, $99.95. New input device offers adjustable base and cursor-release delay. *Feb 96, p. 68*

★★★★ **DrawingSlate II,** CalComp, 602/948-6540, $395. Responsive digitizing tablet is an excellent choice for artists and illustrators. *Jun 95, p. 83*

★★★ **GlidePoint,** Alps Electric, 408/432-6000, $99. Alternative pointing device lets you position the cursor by moving your finger. *Jul 95, p. 77*

★★★★/7.5 **Hitachi StudioPad,** Hitachi Digital Graphics, 408/747-0777, $199.99. Graphics tablet for tight quarters. *Apr 96, p. 70*

★★ **Jetstick,** CH Products, 619/598-2518, $74.95. Joystick's hardware is fine, but its manual and software are inadequate. *Sep 95, p. 95*

★★★ **MacAlly,** The Mace Group, 213/780-6110, $49. ADB mouse doesn't stand out from the crowd, but is durable and affordable. *Jul 95, p. 75*

★★★ **Mouse-Trak,** Itac Systems, 214/494-3073, $179. Input device is sturdy, but buttons can be hard to reach. *Nov 95, p. 83*

★★ **Point Pad,** Hagiwara Sys-Com, 619/546-9989, $99. Pointing device is compact but can be awkward to use. *Oct 95, p. 87*

★★★★/7.0 **QuePoint II,** MicroQue, 801/263-1883, $79.95. Despite the drawbacks of a touchpad, the QuePoint's excellent software makes it a clear winner. *Feb 96, p. 68*

★★★★ **Thinking Mouse Macintosh ADB,** Kensington Microware, 415/572-2700, $139.95. Mouse has 4 programmable buttons that can automate tasks. *May 95, p. 83*

★★/4.3 **TouchPad,** Touché Technologies, 612/830-1414, $59.95. The TouchPad matches the PowerBook's dark case. *Feb 96, p. 68*

★★★ **Trackball Pro ADB,** CH Products, 619/598-2518, $119.95. Inexpensive trackball falls short in programmability and overall functionality. *Sep 95, p. 91*

MISCELLANEOUS HARDWARE

★★★/6.4 **Chinon ES-3000,** Chinon America, 310/533-0274, $1095. Digital camera zooms in but with the high price doesn't measure up to Kodak Digital Camera 40's. *Mar 96, p. 77*

★★★★ **Colortron,** Light Source Computer Images, 415/925-4200, $1195. Hand-held spectrophotometer helps match on-screen and printed colors. *Jun 95, p. 56*

★★★ **Kodak Digital Camera 40,** Eastman Kodak, 716/726-7260, $995. Digital camera can use 37mm lens but has some flaws. *Jan 96, p. 59*

★★★★ **Reno Portable CD-ROM Player,** MediaVision, 510/770-8600, $349. Portable CD-ROM player is lightweight, versatile, and easy to set up. *Jun 95, p. 65*

★★ **Smart Label Printer EZ30,** Seiko Instruments USA, 408/922-5800, $199. Label printer's print quality and speed are disappointing. *Nov 95, p. 72*

★★★ **SoftBoard Model 205,** Microfield Graphics, 503/626-9393, $2795. Electronic whiteboard is expensive but does the job. *Jan 96, p. 71*

★★★/5.9 **Sony PC Cam,** Sony Electronics, 941/731-4940, $499. This desktop camera lacks AV strength; its competitor—VideoLabs' FlexCam—is simply the better camera. *Apr 96, p. 77*

MODEMS/NETWORK HARDWARE

★★★ **GeoPort Telecom Adapter Kit,** Apple Computer, 408/996-1010, $129.95. Adapter unlocks the capabilities of Apple's GeoPort modem. *Oct 95, p. 75*

★★★ **Internet Server Solution for WWW,** Apple Computer, 408/996-1010, $2909. Web server is ideally suited for small-business sites. *Oct 95, p. 65*

★★ **Manta 500EN; Starfish Ethernet Access Point,** Digital Ocean, 913/888-3380, Manta $799; Starfish $1850. Wireless-communications package is capable but much too expensive. *Dec 95, p. 77*

★★★★ **OneWorld Combo,** Global Village Communication, 408/523-1000, $1499 without modems; $2099 with modems. Server is the very model of a multiuser modem pool. *Sep 95, p. 78*

★★★★ **OneWorld Internet 1.0, 700 Series,** Global Village Communication, 408/523-1000, $1699 plus monthly fee. Internet gateway offers E-mail and Internet access in an approachable format. *Jun 95, p. 63*

★★★ **Power Class 28.8 Data/Fax Modem,** Motorola, 205/430-8000, $395. Fax modem's hardware is superb, but it's hampered by mediocre software. *Oct 95, p. 89*

★★★/6.3 **QuickStream/3,** Sonic Systems, 408/736-1900, $995; dial-out option $249. Three-port remote-access server is priced right but has its limitations. *Apr 96, p. 62*

★★★★ **TelePort Platinum,** Global Village Communication, 408/523-1000, $279. Reliable fax modem includes call recognition and an answering machine. *Aug 95, p. 81*

★★★★/8.2 **TribeLink2,** Tribe Computer Works, 510/814-3900, $1295; dial-out option $200; additional PPP client licenses $145 for 10 users to $1495 for 500. Two-port remote-access server features Web-based administration. *Apr 96, p. 62*

PRINTERS

★★★★/7.0 **Apple Color StyleWriter 2200,** Apple Computer, 408/996-1010, $419. The (almost) perfect printing companion for your PowerBook. *Apr 96, p. 133*

★★★★/7.2 **Apple Color StyleWriter 2400,** Apple Computer, 408/996-1010, $429. Very good print quality at a reasonable price. *Apr 96, p. 133.* Editors' Choice for best midrange color ink-jet printer. *Apr 96, p. 133*

★★★/6.2 **Canon BJC-210,** Canon Computer Systems, 714/438-3000, $299. Small footprint and low price, but only an average performer. *Apr 96, p. 133*

★★★★/7.1 **Canon BJC-4100,** Canon Computer Systems, 714/438-3000, $399. Excellent print quality and can be used with a PC. *Apr 96, p. 133.* Editors' Choice for best midrange color ink-jet printer. *Apr 96, p. 133*

★★★★/7.2 **Epson Stylus Pro,** Epson America, 310/782-0770, $999. Top-notch 720-dpi output, sprightly performance; a bargain alternative to dye-sub printers. *Apr 96, p. 133.* Editors' Choice for best high-end color ink-jet printer. *Apr 96, p. 133*

★★★★ **Fargo FotoFun,** Fargo Electronics, 612/941-9470, $399.95. Dye-sublimation printer produces good output at a reasonable price. *Jan 96, p. 61*

★★★/5.4 **HP CopyJet M,** Hewlett-Packard, 800/752-0900, $3649. Color copier and ink-jet printer in a single unit. *Feb 96, p. 77*

★★★/6.3 **HP DeskWriter 660C,** Hewlett-Packard, 208/323-2551, $499. Poor color accuracy, blocky text and slow print speeds; easily networked. *Apr 96, p. 133*

★★★★ **HP LaserJet 5MP,** Hewlett-Packard, 800/752-0900, $1299. Laser printer meets the high demands of small businesses and home offices. *Jul 95, p. 58*

★★★★ **LaserWriter 4/600 PS,** Apple Computer, 408/996-1010, $929. Compact printer produces great-looking 600-dpi output. *Dec 95, p. 60*

★★ **Nikon Coolprint,** Nikon Electronic Imaging, 516/547-4355, $2350. Color dye-sublimation printer is fast, but print quality is flawed. *Sep 95, p. 83*

★★★ **Pictura 310,** Fargo Electronics, 612/941-9470, $4995; optional Adobe Level 2 PostScript package $795. Printer produces acceptable print quality, but its color-matching capabilities are substandard. *Jul 95, p. 61.* Editors' Choice for best low-end dye-sublimation printer. *Jan 96, p. 94*

★★★★ **StyleWriter 1200,** Apple Computer, 408/996-1010, $269. Newest model of Apple's ink-jet printer offers improved print quality. *Sep 95, p. 65*

★★★★ **Stylus Color,** Epson America, 310/782-0770, $699. Color ink-jet's print quality is superb and its price is reasonable. *May 95, p. 58*

★★★ **Typhoon 8,** Dataproducts, 818/887-8000, $3100 (600 dpi, 4MB of RAM); $5199 (1200 dpi, 36MB of RAM). Workgroup printer offers top-notch 1200-dpi output, but its price is a bit steep. *Dec 95, p. 64*

★★ **Xerox 4510ps,** Xerox, 800/349-3769, $1745. Printer has neither the performance nor the quality to justify its price. *Dec 95, p. 68*

SCANNERS

★★/3.3 **ArtiScan Z1-600,** Tamarack, 714/744-3979, $649. The ArtiScan Z1-600's poor software, manual, and scanning performance make it hard for us to recommend it, even at its low price. So we won't. *Mar 96, p. 118*

★★/3.7 **Biz Card Manager,** Electronic Document Technology, 408/733-7309, $369. Fast card scanner but more expensive, no automatic scanning or data transfer to contact managers, and makes errors. *Apr 96, p. 64*

★★/3.7 **Biz Card Reader,** Umax Technologies, 510/651-8883, $245. Exports automatically scanned data to contact manager, but uses nonstandard SCSI connector and doesn't have an on/off switch. *Apr 96, p. 64*

★★/3.3 **Color OneScanner,** Apple Computer, 408/996-1010, $859. The Color OneScanner's anemic software bundle and lackluster performance would make it an unexceptional offer even if reasonably priced. *Mar 96, p. 118*

★★/3.1 **CS-300,** Ricoh, 408/954-5326, $599. The CS-300 scanner has one thing going for it: it's dirt cheap. Unfortunately, with performance, software, and documentation this weak, it's still overpriced. *Mar 96, p. 118*

★ **Digital Fotovix IIIS-D,** Tamron Industries, 516/484-8880, $2299. Video slide scanner's image quality doesn't measure up to the competition. *Jan 96, p. 67*

★★★★/7.2 **ES-1200C,** Epson, 310/782-0770, $1299. The ES-1200C scanner has great image quality, respectable speed, and good software, all at a reasonable price. *Mar 96, p. 118.* Editors' Choice for best midrange scanners. *Mar 96, p. 124*

★★★ **Fujitsu ScanPartner Jr.,** Fujitsu Computer Products of America, 408/432-6333, $499. Compact scanner with good OCR software is an economical scanning solution. *Jul 95, p. 63*

★★★★/7.1 **Gemini D-16,** Umax, 510/651-4000, $1895–$1995. The Gemini D-16 is unique in being both a 400-dpi and 800-dpi scanner, depending on the scanning area. But for several hundred dollars above its competitors, you'd better need that extra resolution. *Mar 96, p. 118*

★★★★ **HP ScanJet 3c,** Hewlett-Packard, 208/323-2551, $1179. Economical scanner offers a broad tonal range and accurate colors. *Oct 95, p. 79*

★★★/6.1 **HP ScanJet 4c,** Hewlett-Packard, 208/396-2551, $1175. The HP ScanJet 4c is a respectable performer in all categories, though not exceptional. Limited software is its greatest weakness. *Mar 96, p. 118*

★★/3.8 **IX-4015,** Canon, 714/438-3000, $799. Boasts desk-space economy and an exceptional warranty, but its performance and software bundle are mediocre. *Mar 96, p. 118*

★★★/6.9 **Mac IRISPen,** Image Recognition Integrated Systems, 407/395-7831, $299. Portable, accurate pen OCR scanner. *Apr 96, p. 75*

★★★★★/9.6 **PaperPort Vx,** Visioneer, 415/493-9599, $369. Desktop document scanner just gets bettter. *Mar 96, p. 82*

★★/4.0 **Paragon 1200SP,** Mustek, 714/250-8855, $899–$1000. The Paragon 1200SP is a disappointment, from its performance to its bare-bones manual. Proof that a 600-dpi, 30-bit scanner for $899 isn't a bargain. *Mar 96, p. 118*

★★ **Pro Imager 4000,** PixelCraft, 510/562-2480, $2995. Scanner delivers excellent highlight detail but produces noise in shadow areas. *Jun 95, p. 59*

★★★★ **Pro Imager 8000,** PixelCraft, 510/562-2480, $12,995. Demanding prepress users will like this scanner. *Jun 95, p. 59*

★★★ **Reli 4830T,** Relisys, 408/945-9000, $1699. If you can live with slow performance, this scanner is a bargain. *Jun 95, p. 71*

★★★/5.0 **ScanMaker IIsp,** Microtek, 310/297-5000, $499–$699 (street). The ScanMaker IIsp is a shaky performer at best, especially when it comes to capturing highlight detail (it doesn't), but it's an option for the bargain hunter. *Mar 96, p. 118*

★★★/5.8 **ScanTouch AX-1200,** Nikon, 516/547-4355, $1720. The ScanTouch AX-1200 is a solid performer, but at this price it should be closer to stunning. *Mar 96, p. 118*

★★★/5.6 **Silverscanner III,** La Cie, 503/520-9000, $1499–$1699. The Silverscanner III is a good performer in many respects, but its poor color accuracy and high price place it behind the Epson ES-1200C on which it's based. *Mar 96, p. 118*

★★★★ **SprintScan 35,** Polaroid, 617/386-2000, $1995. Compact, efficient, cost-effective scanner transfers slides or negatives to a Mac. *Jun 95, p. 79*

★★★/5.9 **StudioScan IIsi,** Agfa, 508/658-5600, $900 (street). The StudioScan IIsi gets good performance from its 30-bit, 400-dpi engine. Agfa's software is powerful and flexible, but could be easier to use. *Mar 96, p. 118*

★★/3.8 **VIP Scan,** La Cie, 503/520-9000, $199. Scans automatically to contact manager; includes Now Contact; uses nonstandard SCSI connector. *Apr 96, p. 64*

★★★ **Vista-S8,** Umax Technologies, 510/651-8883,

continues

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Star Ratings

$995 (LE+); $1095 (Pro+). 24-bit color flatbed scanner has a lot of useful features for its low price. *Jul 95, p. 67*

SPEAKERS

★★★★/8.8 **Acoustimass,** Bose, 508/879-7330, $699. Full, rich, natural sound; treble slightly rolled off but clean. *Mar 96, p. 157.* **Editors' Choice** for best high-end three-piece speakers. *Mar 96, p. 159*

★★★★/7.1 **ACS 52,** Altec Lansing, 717/296-2818, $128. Clean, reasonably solid presentation; crisp highs; powerful bass for such a small design. *Mar 96, p. 157*

★★★★/7.1 **AMX-16,** Radio Shack, 817/390-3300, $120 (street). Clean, reasonably crisp, slightly bright, decent bass, somewhat lacking in low-end heft. *Mar 96, p. 157*

★★★/6.8 **AppleDesign Powered Speakers,** Apple Computer, 408/996-1010, $179. Clean, reasonably solid presentation. Bass is good but doesn't shake the foundations. *Mar 96, p. 157*

★★/4.9 **AV270 Powered Speakers,** Advent, 708/317-3700, $179. Clean and smooth. Somewhat tinny quality to midrange and highs. *Mar 96, p. 157*

★★★/6.2 **AV622 Powered Speakers,** Advent, 708/317-3700, $299. Clean and smooth, with somewhat lightweight character. Slight treble emphasis. Bass has reasonable weight and impact. *Mar 96, p. 157*

★★★★ **DayStar PowerPro 601/DayStar Turbo 601,** DayStar Digital, 404/967-2077, PowerPro 601 $1599; Turbo 601 $1499. Impressive 601-based accelerator cards squeeze more performance out of Macs. *Sep 95, p. 67*

★★★/5.2 **J-688AV,** Jazz, 818/336-2689, $149. Reasonably smooth sound, noticeably rolled-off high end, slightly harsh midrange becomes a bit fatiguing over a long listening session. *Mar 96, p. 157*

★★/4.7 **J-902,** Jazz, 818/336-2689, $150. Clear reproduction, with moderate bass emphasis and overemphasized treble. Generally thin sonic character because of the high-frequency emphasis. *Mar 96, p. 157*

★★★/5.8 **JPS 45,** Jensen, 708/317-3700, $149. Clean, reasonably crisp, slightly bright; an almost sandpapery affect on cymbals; adequate bass, somewhat lacking in low-end heft. *Mar 96, p. 157*

★★/3.5 **LabTec LCS-3210,** Labtec, 360/896-2000, $119 (street). Decent, slightly boomy bass, harsh midrange, rolled-off treble. Sound gets harsher when played at loud volumes. *Mar 96, p. 157*

★★★/6.2 **MA-12CP,** Roland, 213/685-5141, $319. Relatively warm, well-balanced sound; slightly lightweight bass. Tends to sound harsh when played at normal volume levels. *Mar 96, p. 157*

★★★★/7.8 **MediaMate,** Bose, 508/879-7330, $339. Full, warm, rich, natural sound. Cymbals had considerable clarity and detail and sounded realistic. Amazingly robust for such a small speaker. *Mar 96, p. 157.* **Editors' Choice** for best desktop speakers. *Mar 96, p. 159*

★★★/6.6 **MLi-95,** Midi Land, 909/592-1168, $120. Surprisingly good sound for the money. Clean, reasonably clear; fine musical details a wee bit indistinct, good voice reproduction, adequate bass. Smooth highs, accurate presentation. *Mar 96, p. 157*

★★★★/7.5 **MMS 557,** Audio-Technica, 216/686-2600, $150. Relatively clean, slightly bright, crisp sound. Surprisingly robust bass for a small box. *Mar 96, p. 157*

★★ **NEC AudioTower,** NEC Technologies, 708/860-9500, $99. Speaker system's sound quality is nothing to shout about. *May 95, p. 81*

★★★★/7.9 **SoundWorks,** Cambridge SoundWorks, 617/332-5936, $220. Clean, well-balanced sound, slight upper midrange emphasis, good bass. *Mar 96, p. 157.* **Editors' Choice** for best low-end three-piece speakers. *Mar 96, p. 157*

★★★/5.7 **SurroundSound ACS 500,** Altec Lansing, 717/296-2818, $450. Robust sound, slightly smeared highs, and slight harshness when played at loud volume. Bass is powerful, but a bit boomy. *Mar 96, p. 157*

★★/3.7 **SW150,** Koss, 414/964-5000, $180. Weak bass, harsh midrange, rolled-off treble. No saving graces. *Mar 96, p. 157*

★★★/6.4 **TC1490-7SUB,** Multimedia Labs, 410/429-4300, $249. Clean sound and thin balance; adjusting subwoofer output just makes bass boom, but bass is always lightweight. *Mar 96, p. 157*

★★★ **Vivid 3D Pro,** NuReality, 714/442-1080, $149.95. Sound-enhancement system produces 3-D sound from a pair of speakers. *Aug 95, p. 87*

★★★/6.4 **YST-SS1010,** Yamaha, 714/522-9240, $350. Relatively warm, well-balanced sound, slightly rolled-off treble with slight smearing effect on cymbals, average bass impact with subwoofer. Tends to sound harsh when played at loud volume levels. *Mar 96, p. 157*

SYSTEMS/STORAGE

★★★ **Envoy Wireless Communicator,** Motorola, 800/894-7353, $1000 to $1500. Magic Cap–based PDA was our reviewers' first choice for E-mail. *Aug 95, p. 62*

★★★★ **EZ135,** SyQuest Technology, 510/226-4000, $249. Removable drive is fast and comes with a fine selection of bundled software. *Dec 95, p. 58*

★★★ **Marco Wireless Communicator,** Motorola, 800/894-7353, $900 to $1400. Newton OS–based PDA includes a radio modem. *Aug 95, p. 62*

★★★ **Master CD Pro,** MicroNet Technology, 714/453-6000, $4995. Recordable CD-ROM drive is a good tool for professional CD production. *Aug 95, p. 83*

★★★★/7.5 **MessagePad 120 with Newton OS 2.0,** Apple Computer, 408/996-1010, $699. If the first Newton had been this good, you'd already have one. *Mar 96, p. 57*

★★★/5.6 **Performa 5125CD,** Apple Computer, 408/996-1010, $2300. The all-in-one design is appealing, but the performance is just so-so. *Feb 96, p. 96*

★★★★/7.1 **Power 100,** Power Computing, 512/258-1350, $1699. Powerful and inexpensive, the Power 100 comes bundled with all the extras you'd want. *Feb 96, p. 96.* **Editors' Choice** for best home and small office Mac.

★★★★/7.4 **Power 120,** Power Computing, 512/258-1350, $1999 . Like its Power 100 sibling, this system offers strong performance at a good price. *Feb 96, p. 96*

★★★/5.8 **PowerBook 5300,** Apple Computer, 408/996-1010, $2300. A gray-scale screen and middling performance make this just an acceptable notebook. *Feb 96, p. 96*

★★★/5.9 **PowerBook 5300c,** Apple Computer, 408/996-1010, $4500. A great color screen and strong expandibility balance with so-so performance. *Feb 96, p. 58.* **Editors' Choice** for best portable Mac

Feb 96, p. 96

★★★/5.9 **PowerBook 5300cs,** Apple Computer, 408/996-1010, $3600. Good expansion, so-so speed, and a decent color screen make this fine for short-term use. *Feb 96, p. 96*

★★★/5.9 **PowerBook Duo 2300c,** Apple Computer, 408/996-1010, $3699 (8MB of RAM, 750MB hard drive); $4699 (20MB of RAM, 1.1GB hard drive, 14.4-Kbps fax modem). This new Duo packs a lot of power into a little package. *Apr 96, p. 58*

★★★★/7.5 **PowerCurve 601/120,** Power Computing, 512/388-6868, base model $1849. Apple's Power Mac 7500 has a new rival; the PowerCurve 601/120 offers excellent speed at a competitive price. *Apr 96, p. 57*

★★★/6.5 **Power Macintosh 7200/75,** Apple Computer, 408/996-1010, $1600. A dumbed-down version of the 7500, this system offers just the basics. *Feb 96, p. 96*

★★★★/7.8 **Power Macintosh 7500/100,** Apple Computer, 408/996-1010, $3100. Powerful and relatively inexpensive, the Power Mac 7500/100 shines in its easy-to-upgrade design. *Feb 96, p. 96.* **Editors' Choice** for best business-and-professional Mac.

★★★★/7.7 **Power Macintosh 8500/120,** Apple Computer, 408/996-1010, $4200. The 8500's 604 CPU and bundled cache give it good performance. *Feb 96, p. 96.* **Editors' Choice** for best publishing and graphics Mac and best media authoring Mac.

★★★ **Power Macintosh 9500/132,** Apple Computer, 408/996-1010, $5799. Power Mac offers speed, expansion, and lots of memory. *Oct 95, p. 60*

★★★★/7.6 **PowerWave 604/120,** Power Computing, 512/258-1350, $3199. Power Computing has made the 604 CPU available at 601-based systems' prices. *Feb 96, p. 54.* **Editors' Choice** for best business-and-professional Mac. *Feb 96, p. 96*

★★★★/7.6 **PowerWave 604/132,** Power Computing, 512/258-1350, $3699 (256K cache card included). This fast, sensibly priced system bundled with bonus software is a great value. *Feb 96, p. 54*

★★★★/7.7 **PowerWave 604/150,** Power Computing, 512/258-1350, $4499 (512K cache card included). The fastest Mac currently available, it carries a price that's not quite as attractive as for other PowerWave models. *Feb 96, p. 54*

★★ **RCD-1000,** Pinnacle Micro, 714/727-3300, $1695. CD-Recordable drive is easy to use but too unreliable for day-to-day backup. *Jun 95, p. 81*

★★★/5.1 **SCSI PowerPlug II,** Hot Wire Technology, 203/761-0651, $119.99. A fast way to swap SCSI devices. *Feb 96, p. 86*

★★★ **SledgeHammer8000FT,** FWB, 415/325-4392, $23,599. Level 5 RAID array provides constant access to your stored information. *Sep 95, p. 59*

★★★ **Sony Magic Link,** Sony, 800/571-7669, $699.95. Using this PDA is a breeze, but it lacks applications. *Aug 95, p. 62*

★★★/5.8 **System 100,** Radius, 408/541-6100, $10,500. Radius bundles its mediocre digital-video cards on a relabeled Power Mac 8100—that's no wise investment. *Feb 96, p. 96*

★★★★ **Zip Drive,** Iomega, 801/778-1000, $199.95; 100MB cartridge $19.95. External drive combines speedy performance, convenience, and economy. *Jul 95, p. 59*

VIDEO/DISPLAY

★★/4.2 **AlphaScan GLX,** Sampo Technology, 770/449-6220, $1495. Low price fails to outweigh poor

continues

Circle 10 on reader service card

Star Ratings

image quality. *Feb 96, p. 165*

★★★/5.5 **Diamond Pro 21TX,** Mitsubishi Electronics America, 714/220-2500, $2199. Washed-out colors hold back an otherwise strong contender. *Feb 96, p. 165*

★★★ **EAsycolor 24/1360,** EA Research, 510/867-0967, $1699. Video board offers Photoshop CMYK acceleration and multisync monitor support. *Aug 95, p. 64*

★★★ **Encoder Pro,** P2 Systems, 206/525-2081, $259. Inexpensive Mac-to-TV adapter is a good value. *Jan 96, p. 69*

★★/4.4 **FlexScan F2 21,** Nanao, 310/325-5202, $2299. Blurry, dim image and too high a price. *Feb 96, p. 165*

★★/4.8 **Multigraph 445X,** Nokia Display Products, 415/943-4071, $2775. Adequate image quality, but at too high a price. *Feb 96, p. 165*

★★★/6.2 **Multiple Scan 20 Display,** Apple Computer, 408/996-1010, $2149. Not as vibrant as it could be, but good value. *Feb 96, p. 165*

★★★/5.9 **MultiscanTC,** Sony, 408/432-0190, $3950. Special color-adjustment tools don't overcome mediocre performance. *Feb 96, p. 165*

★★★★/7.3 **MultiSync XE21,** NEC Technologies, 508/264-8000, $1899. Rich, bright images complemented by excellent controls. *Feb 96, p. 165*

★★★/5.8 **MultiView 21,** Radius, 408/541-5700, $2149. Seductively rich colors, but too soft a focus. *Feb 96, p. 165*

★★★ **PaintBoard Prism GT,** RasterOps, 408/562-4200, $999. Video board offers good QuickDraw acceleration but no Photoshop acceleration. *Aug 95, p. 64*

★★★/5.0 **PanaSync/Pro C2192P,** Panasonic Communications & Systems, 201/348-7000, $1999. Reasonable price fails to overcome weak image quality. *Feb 96, p. 165*

★★★/6.6 **Pivot 1700,** Portrait Display Labs, 510/227-2700, $1099. Good image quality but doesn't automatically switch views when rotated. *Mar 96, p. 70*

★★★★ **Presenter TView,** TView, 503/643-1662, $449. Reliable Mac-to-TV adapter produces an excellent picture. *Jan 96, p. 69*

★★★★/8.6 **PressView 21 SR,** Radius, 408/541-6100, $3,999. The best professional-quality display gets better. *Feb 96, p. 62*

★★★ **QA-1500,** Sharp Electronics, 201/529-8731, $5795. LCD panel's display is crisp, but placing a presentation on its PC Card is cumbersome. *May 95, p. 69*

★★★/5.0 **QuickDraw 3D Accelerator Card,** Apple Computer, 408/996-1010, $400. Supports texture maps but only minor speed gains with major 3-D applications. *Apr 96, p. 60*

★★★ **QuickTake 150,** Apple Computer, 408/996-1010, $739. Digital camera is easy to use and includes close-up lens. *Jan 96, p. 59*

★★ **Radius Telecast,** Radius, 408/541-6100, $9995. QuickTime-based video editor has potential, but software is not yet mature. *Jan 96, p. 65*

★★★★/7.3 **RasterOps SuperScan Mc 21,** NSA/Hitachi, 617/461-8300, $2299. Top performance plus sensible, intuitive controls create a winning combination. *Feb 96, p. 165.* **Editors' Choice** for best two-page monitor. *Feb 96, p. 165*

★★★★ **SpigotPower AV,** Radius, 408/541-6100, $999. You can make full-screen movies with this first-rate video-compression board. *Jun 95, p. 67.* **Editors' Choice** for best digital-video card. *Aug 95, p. 112*

★★/4.1 **SyncMaster 20GLs,** Samsung Electronics America, 201/691-6200, $1599. Glare-catching, image-distorting tube and weak controls. *Feb 96, p. 165*

★★★★ **Targa 2000 1.2,** Truevision, 408/562-4200, $5495. Video board offers good picture quality and fully synced 16-bit audio. *Dec 95, p. 71*

★★★★ **Thunder IV GX 1360,** Radius, 408/541-6100, $2999. Video board provides impressive QuickDraw and Photoshop acceleration. *Aug 95, p. 64*

★★★ **VideoDirector 1.5,** Gold Disk, 408/782-0200, $199.95. Low-end video-editing system logs, edits, and organizes videotape footage. *Jun 95, p. 75*

★★★/5.8 **ViewSonic 21PS,** ViewSonic, 909/869-7976, $2095. Bright, vibrant, though not particularly sharp image. *Feb 96, p. 165*

★★★/5.3 **VisionMaster Pro 21,** Iiyama North America, 215/957-6543, $1995. The image quality is good, but the controls are confusing. *Feb 96, p. 165*

★/1.9 **Yarc Screamer,** Yarc Systems, 805/499-9444, $995. Supports texture maps but slower than using no board in some instances; chokes on simple models. *Apr 96, p. 60* m

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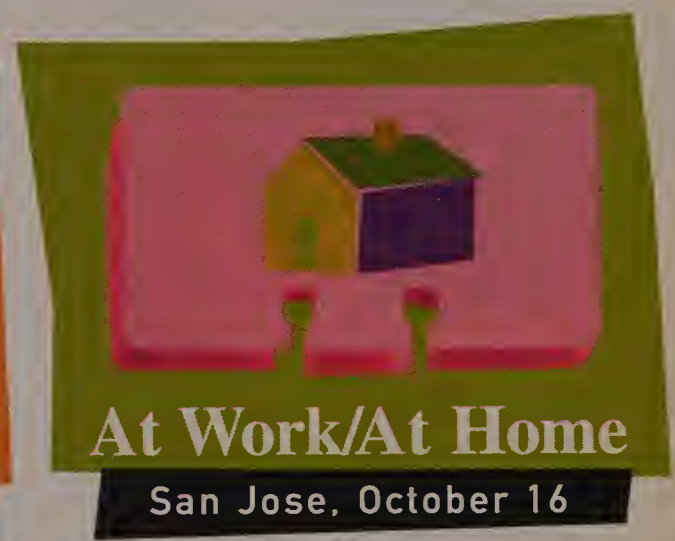

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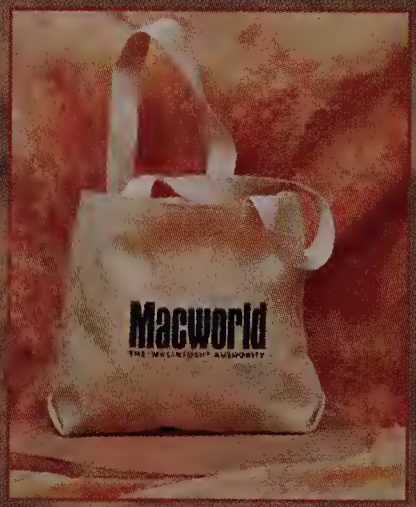

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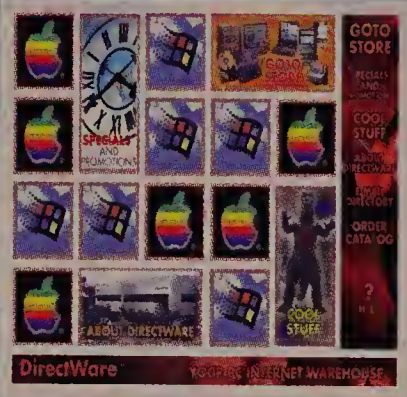

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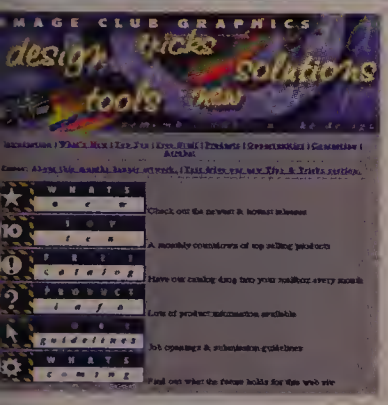

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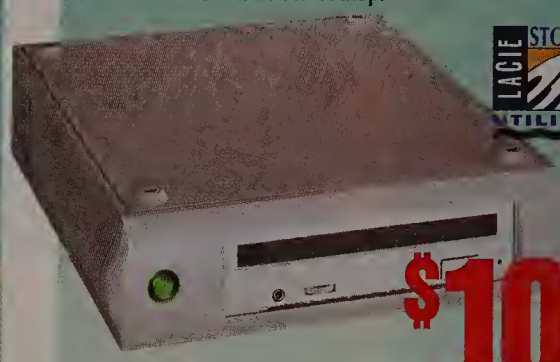

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Silverscanner III Package 2
Pro color, 600x1200dpi interpolated up to 4800 dpi.
- Photoshop (full)
- Read-It Pro OCR
- Silverscan

$1799

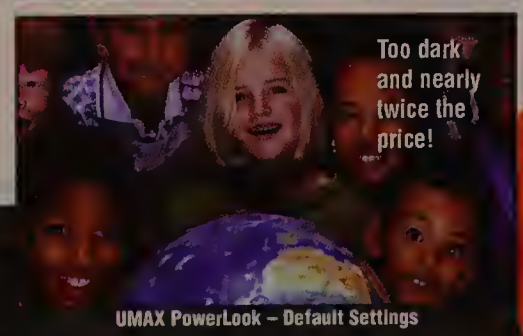
Transparency Adapter **$799**

Sheet Feeder **$499**

$140,000 Drum Scanner – Default Settings

La Cie Silverscanner III – Default Settings

Hewlitt-Packard ScanJet IIcx – Default Settings



UMAX PowerLook – Default Settings

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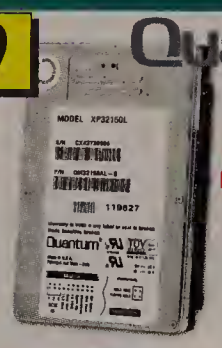
30 DAY BEST BUY

Internal Fireball
C104 0001

$969 Quantum ATLAS 4.3GB 7200 RPM 1024 CACHE

5 Year Warranty 30 DAY BEST BUY



Internal Atlas
C104 0005

$349* ClubMac 200MB Removable 200MB

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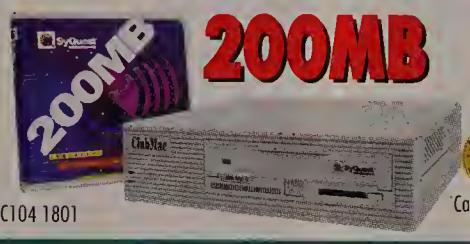


30 DAY

C104 1801 *Cartridge sold separately.

$199.99 Iomega Zip Drive 100MB

I044 1010

IN STOCK

iomega

Features:
29ms Access Time
One Free Cartridge
ONE Year Warranty

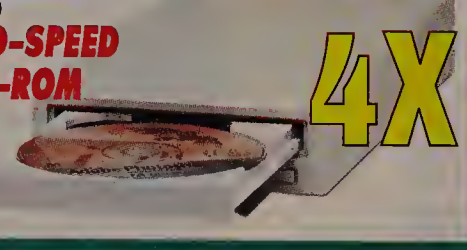
$339 N024 1070 NEC

MultiSpin 4Xc 7 Disc Changer Load 7 Discs at a time!

1 Year Warranty

$179 ClubMac 4X

C104 1500 QUAD-SPEED CD-ROM



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ClubMac 1-800-258-2622

CLUBMAC HARD DRIVES

Quantum

30 DAY

		Internal/External	Internal/External
850MB TrailBlazer		C104 0002/C10400052	$199/$259
1080MB Fireball		C104 0000/C104 0050	$259/$319
1280MB Fireball		C104 0001/C104 0051	$299/$359
2200MB Capella		C104 0003/C104 0053	$629/$689
4300MB Atlas	BEST BUY	C104 0005/C104 0055	$969/$1029

Seagate

30 DAY 5 Year Warranty

		Internal/External	Internal/External
1.0GB Medalist	ST51080	C104 0302/C104 0352	$269/$329
4.3GB Hawk 4	ST15230N	C104 0304/C104 0354	$999/$1059
2.5GB Barracuda 2 LP	ST32550N	C104 0300/C104 0350	$769/$829
4.3GB Barracuda 4	ST15150N	C104 0301/C104 0351	$1199/$1259

5.25" Full Height

		Internal/External	Internal/External
9.1GB Elite-9	ST410800N	C104 0305/C104 0 355	$2199/$2299

CLUBMAC 2.5" HARD DRIVES

Quantum

30 DAY 3 Year Warranty

	Internal	Internal
810MB Europa IDE	C104 0007	$329
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CLUBMAC FAST AND WIDE DRIVES

Seagate

30 DAY 5 Year Warranty

	Internal/External	Internal/External
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4.3GB Barracuda 4 ST15150W	C104 0401/C104 0451	$1319/$1419
9.1GB Elite 9 ST410800W	C104 0402/C104 0452	$2269/$2389

Quantum

30 DAY 5 Year Warranty

	Internal/External	Internal/External
2.2GB Capella VP32210SW	C104 0100/C104 0150	$699/$799
4.3GB Grand Prix XP34301SW	C104 0101/C104 0151	$1029/$1129
4.3GB Atlas XP343005W	C104 0102/C104 0152	$1295/$1395

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FWB incorporated

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NEC

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N024 1070	MultiSpin 4Xc 7 Disc Changer	350ms	600k/sec	$339

ClubMac

30 DAY 1 Year Warranty

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30 DAY

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C104 1803	ClubMac 105MB 3.5" Removable*	$
5198 2001	SyQuest EZ135 135MB 3.5" Removable	$

*Cartridge not included

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	Media	Qty 1	Qty 10	Q
5198 1010	44MB	$40ea	$39.50ea	$3
5198 1011	88MB	$44ea	$43.50ea	$4
5198 1012	200MB	$69ea	$68.00ea	$6
5198 1013	105MB	$35ea	$34.50ea	$3
5198 1014	270MB	$57ea	$56.00ea	$5
5198 2010	EZ135MB	$23ea	$22.50ea	$2

iomega

1 Year Warranty

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C104 0200	ClubMac 40GB DLT Subsystem DLT 4000	$49
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V010 1025	4mm 60 meter DAT Cartridge	$
V010 1018	4mm 90 meter DAT Cartridge	
V010 1043	4mm 120 meter DAT Cartridge	$
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Q034 1022	1/2 inch media far DLT 4000	$

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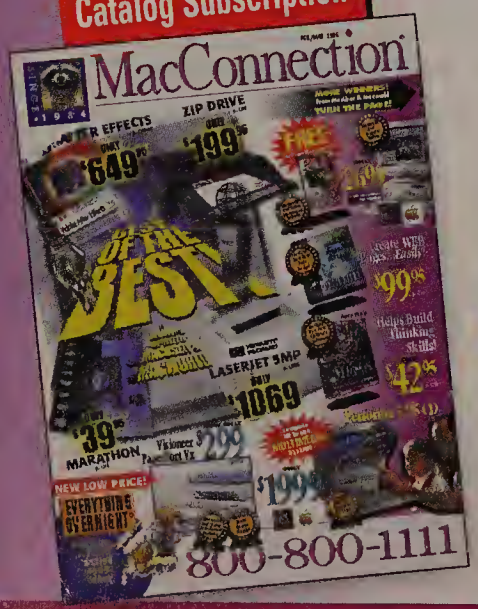

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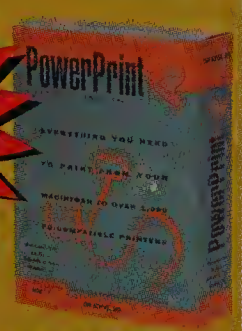

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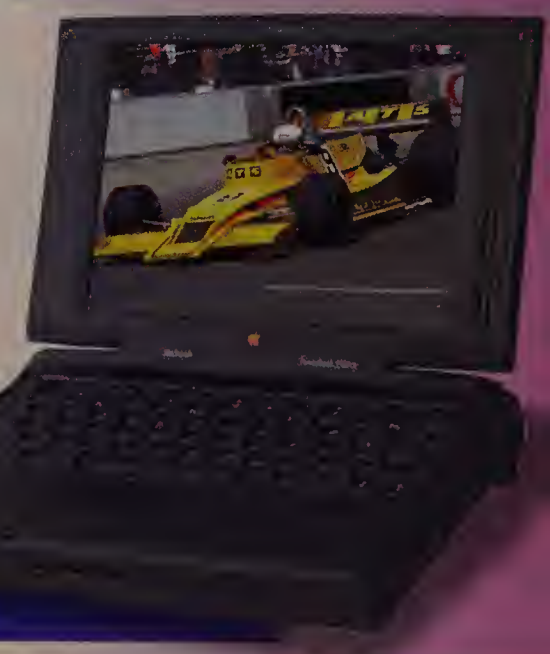

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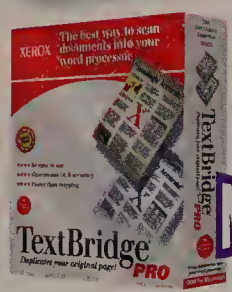

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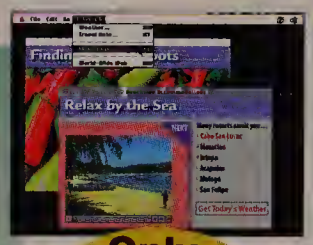

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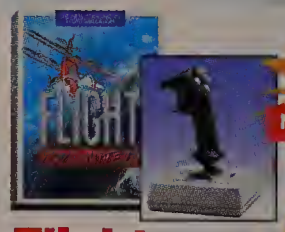

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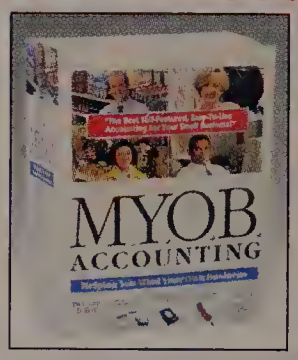

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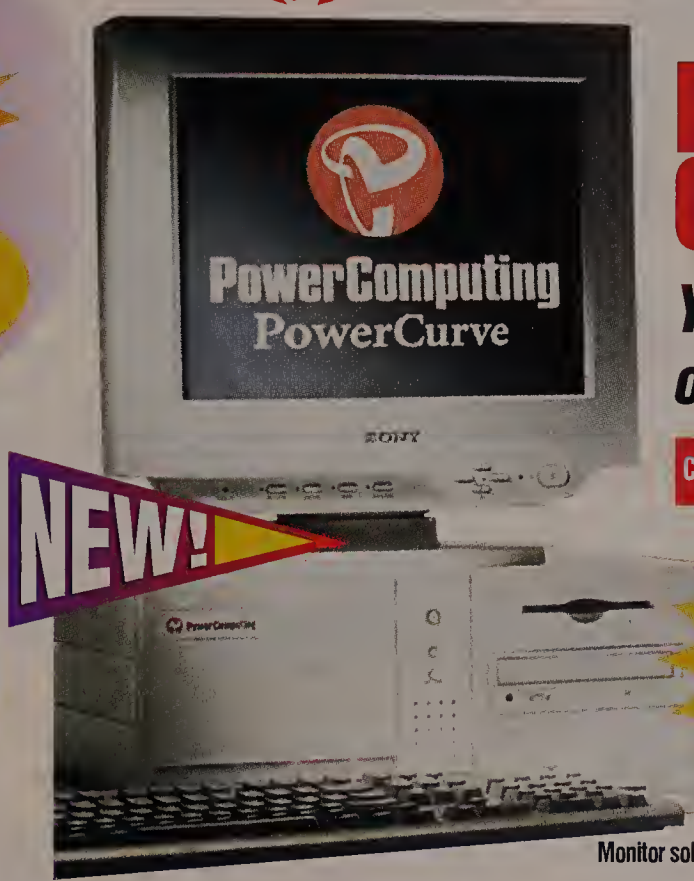

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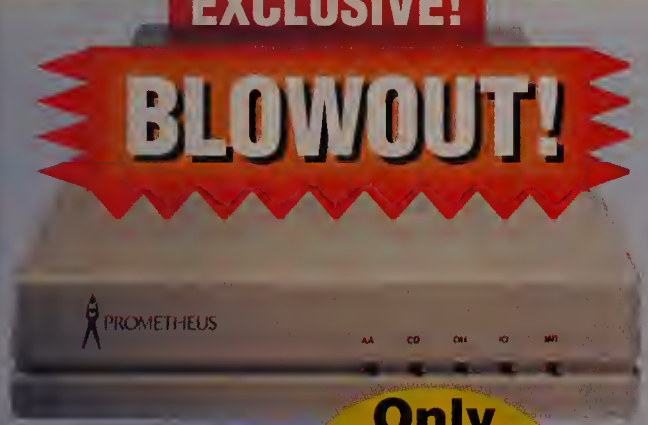

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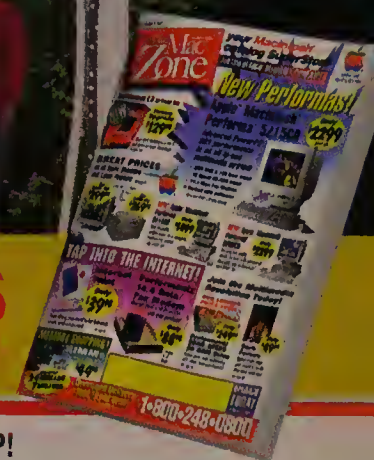

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Micropolis	2050MB	8.5ms	7200	512K	5yr	MC4221AV	$665	$725
Conner	2147MB	9ms	5400	512K	5yr	CFP2105S	$609	$669
Conner	2147MB	9ms	7200	512K	5yr	CFP2105S	$639	$699
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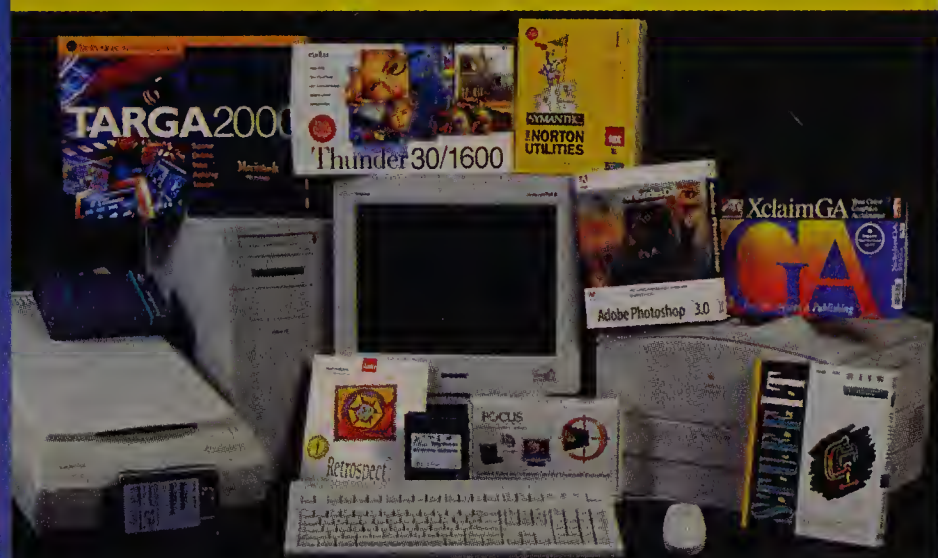

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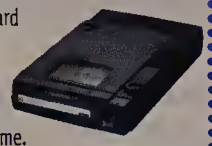

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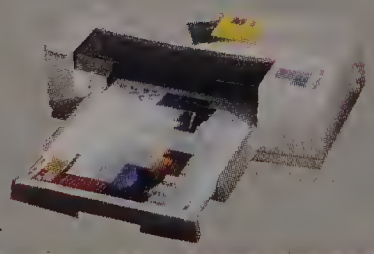

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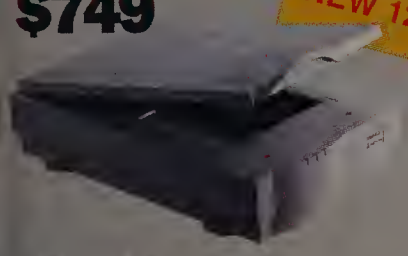

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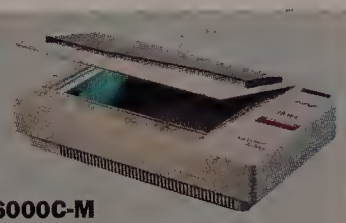

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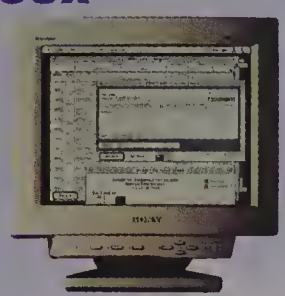

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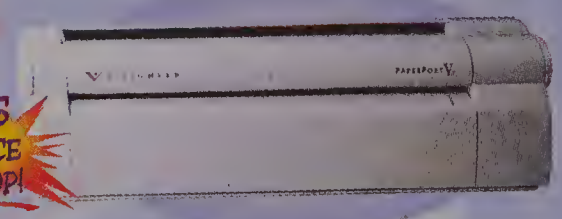

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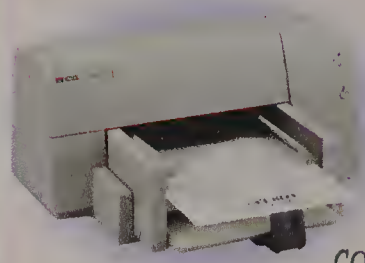

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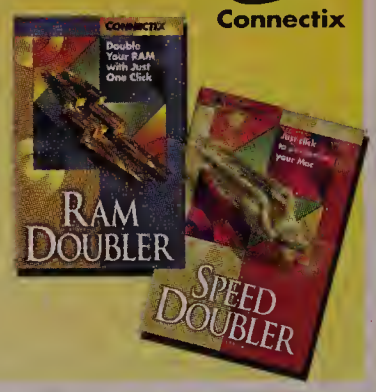

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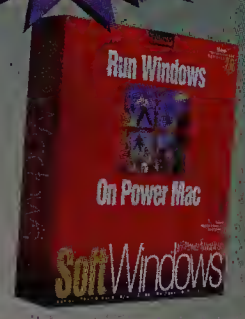

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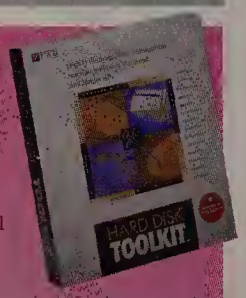

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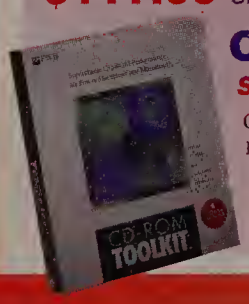

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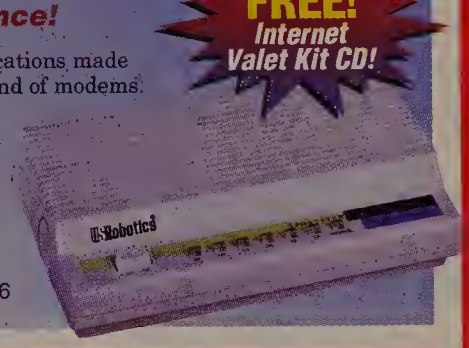

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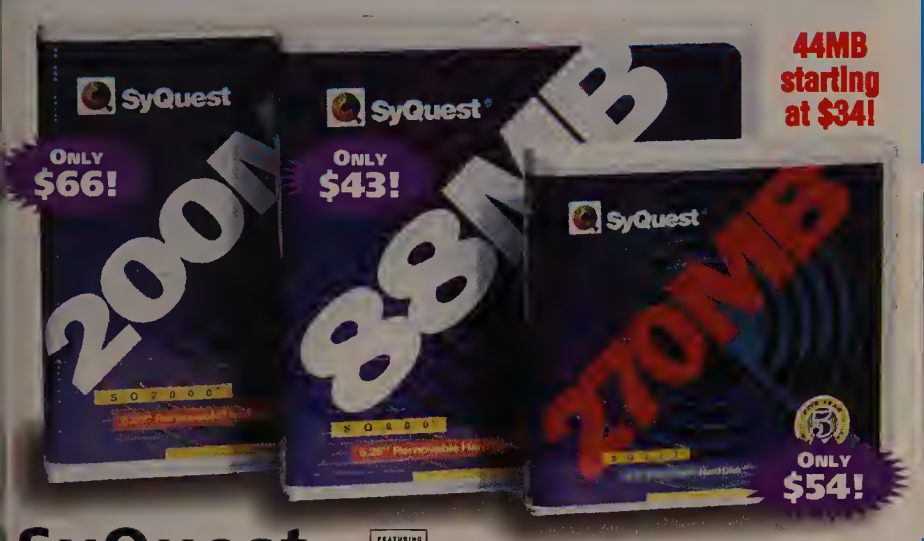

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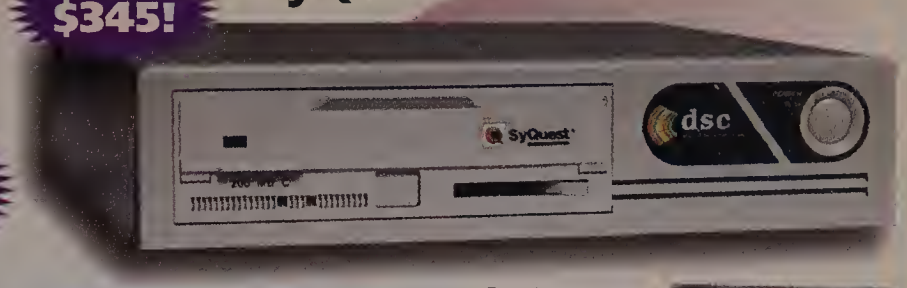

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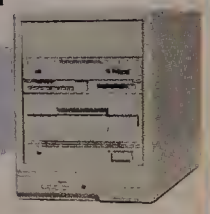

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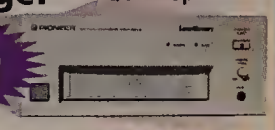

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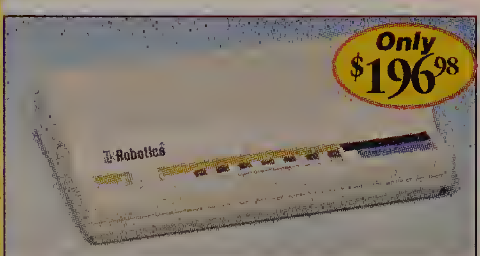

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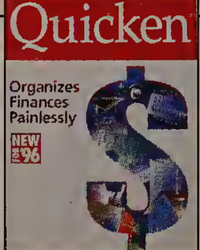

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Apple Macintosh Plus, SE	1	4				61	104							
Apple Macintosh SE30	1/2	32				61	104		219			419	819	
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Apple Performa 400	4	10				61	104		219					
Apple Performa 405, 410, 430	4	10				61	104		219					
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Apple Performa 630	4	36					89		171			334	819	
Apple Centris 610	4	68	512k	59			89		171			334	819	
Apple Centris 650	4	132	512k	59			89		171			334	819	
Apple Centris 660AV	4	68					89		171			334	819	
Apple Quadra 605	4	36	512k	59			89		171			334	819	
Apple Quadra 610	4	68					89		171			334	819	
Apple Quadra 630	4	36					89		171			334	819	
Apple Quadra 650	4/8	132/136					89		171			334	819	
Apple Quadra 660AV	4	68					89		171			334	819	
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Apple Workgroup Server 95	16/32/48	256					104					419	1112	
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Apple Power Macintosh 6100/66 & 6100/66AV (pairs)	8/16	72					89		171			334	819	
Apple Power Macintosh 7100/66AV (pairs)	16	136					89		171			334	819	
Apple Power Macintosh 7100/80, 7100/80AV (pairs)	8/16	136					89		171			334	819	
Apple Power Macintosh 8100/100, 8100/100AV (pairs)	8/16	264					89		171			334	819	
Apple Power Macintosh 8100/110 (pairs)	8/16	264	512k	59			89		171			334	819	
Apple Power Macintosh 8500/120	8/16	264			139				199			379	749	1586
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Apple Power Macintosh 9500	8/16	264	1mg	99	139				199			379	749	1586
Apple LaserWriter LS	512k	1				512k=37								
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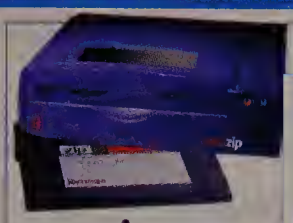

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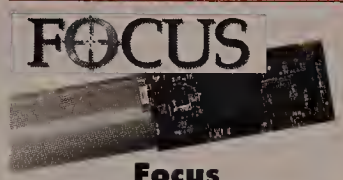

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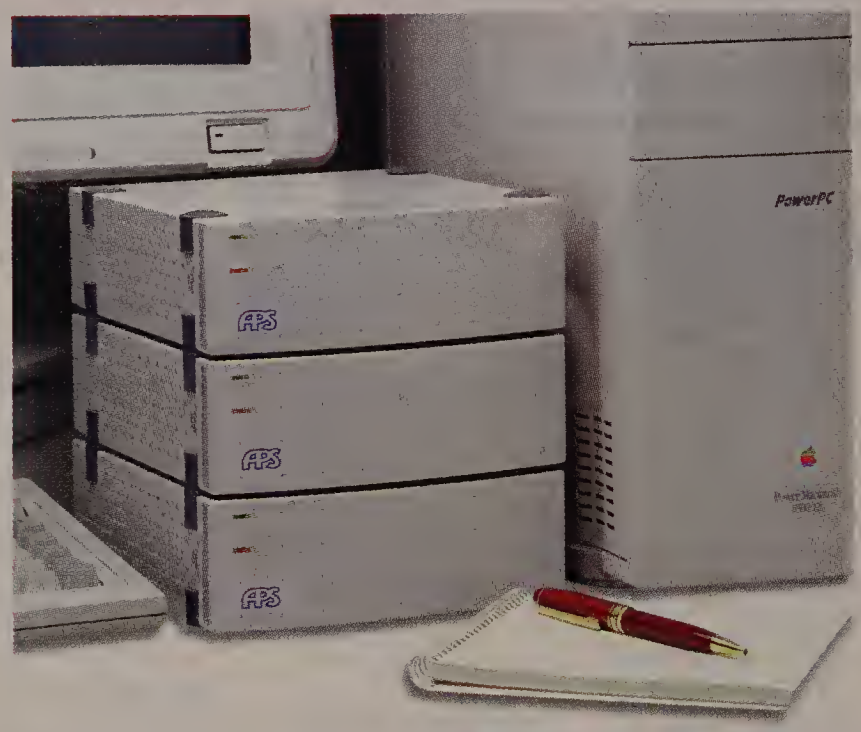

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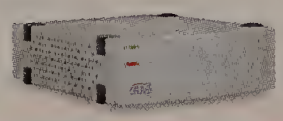

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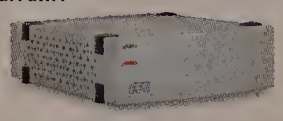

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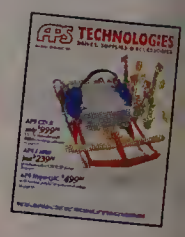

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*Only with the purchase of one SQ 270 cartridge

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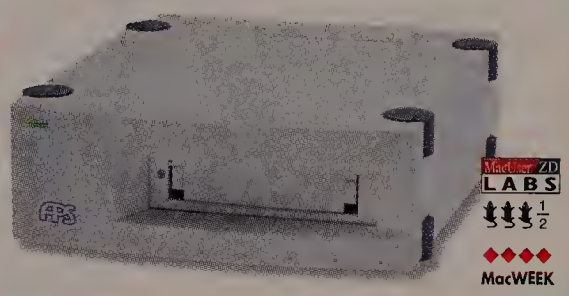

MacWEEK

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APS TAPE DRIVES

odel	Capacity/Awards	Internal	SR2000
S HyperQIC	8GB MacWEEK, MacUser ZD LABS	N/A	$499.95
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S DAT	2GB	$649.95	699.95
5-1 Non-Compression Mech.			
S HyperDAT	8GB	849.95	899.95
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S HyperDAT Pro	8GB	1049.95	1099.95
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S DAT Loader600	48GB		
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Model	Capacity/Awards	Internal	SR2000
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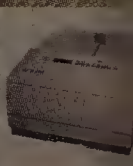

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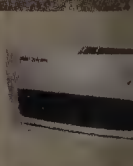

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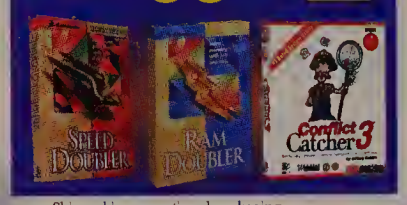

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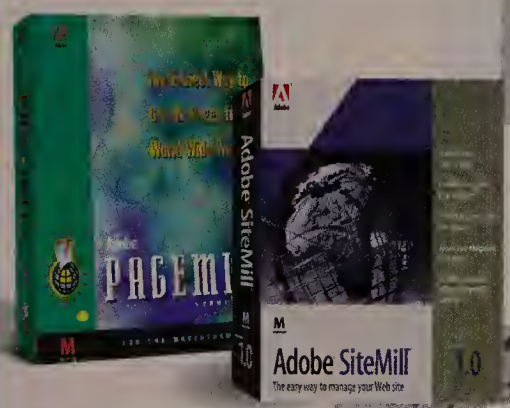

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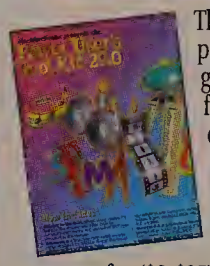

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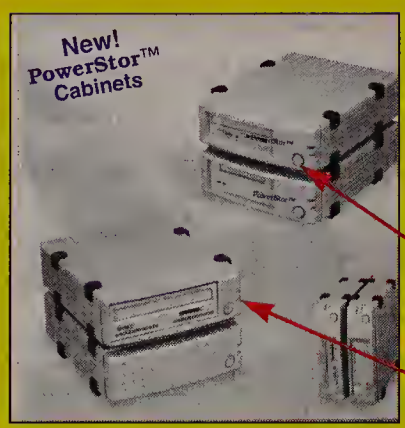

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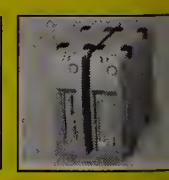

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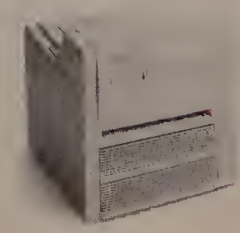

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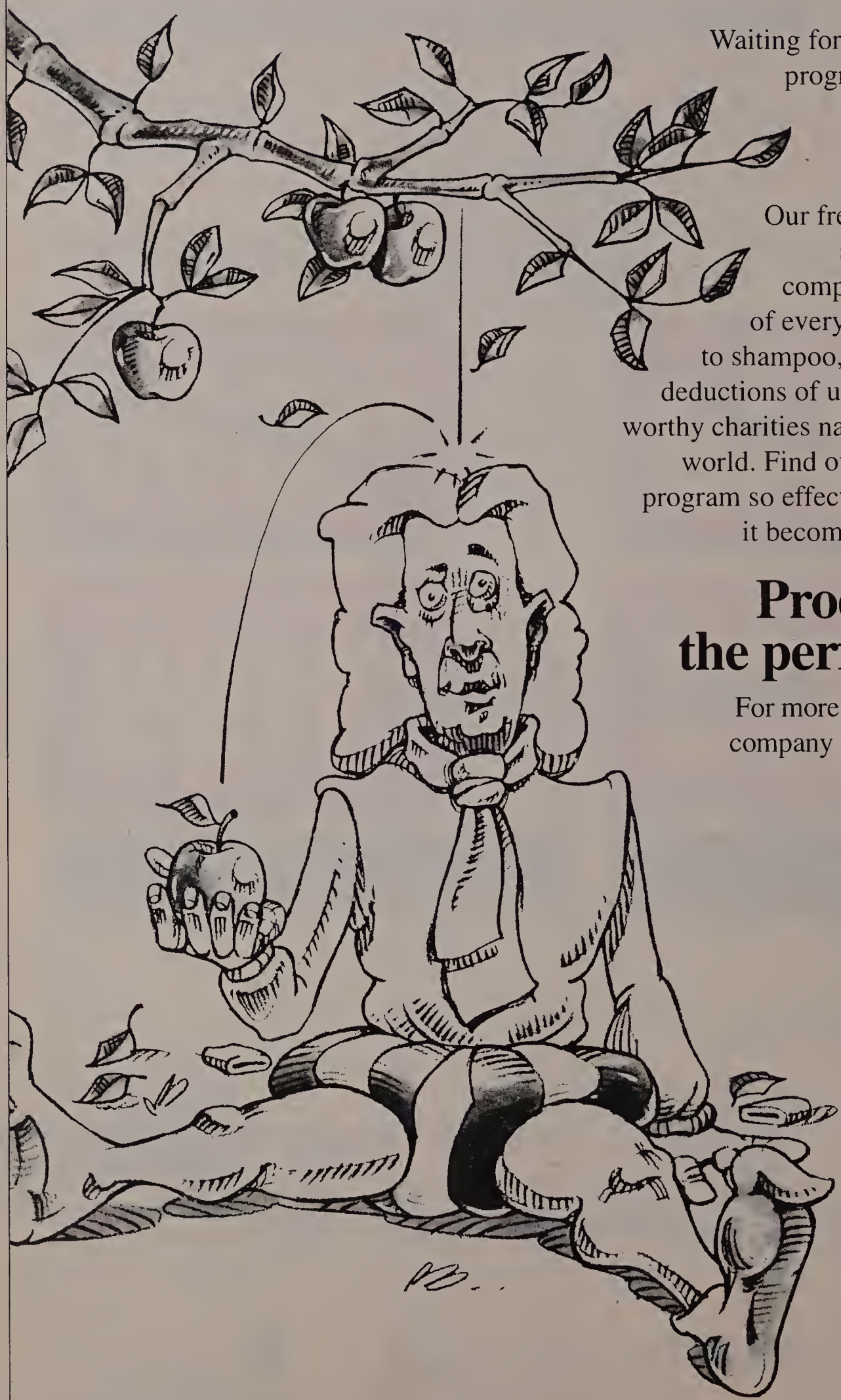

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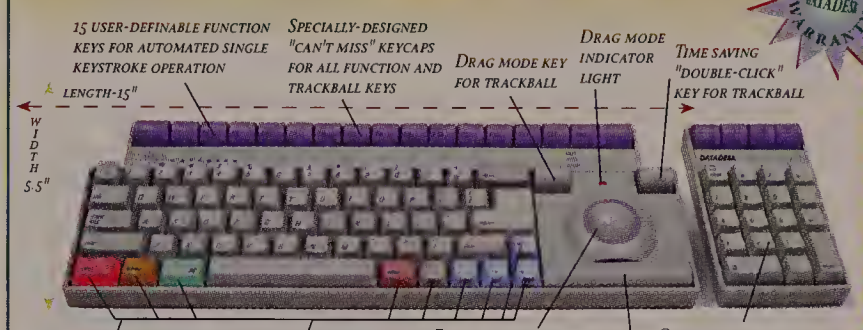

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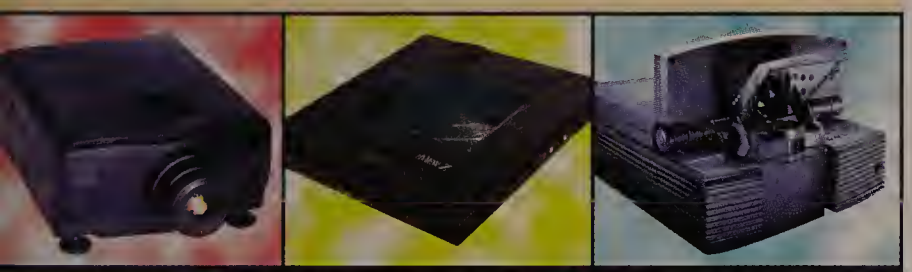

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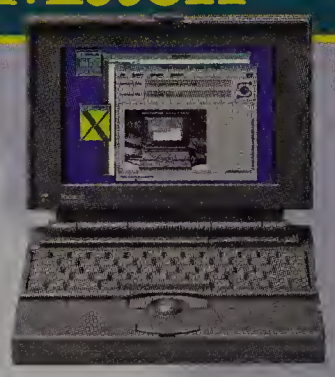

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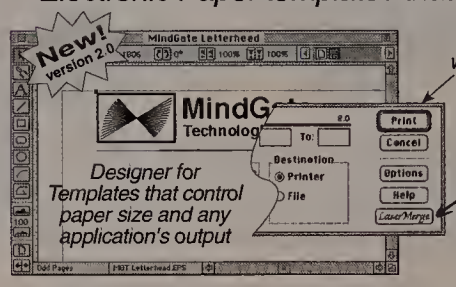

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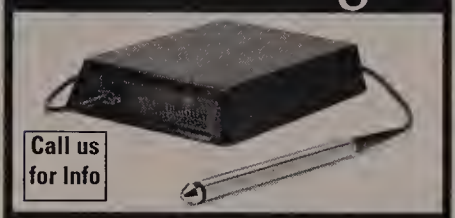

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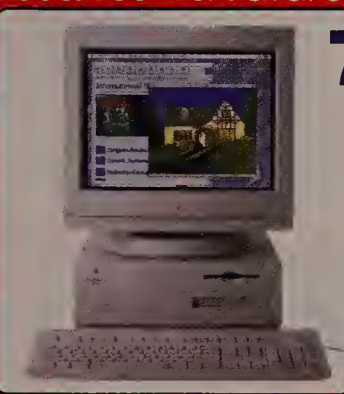

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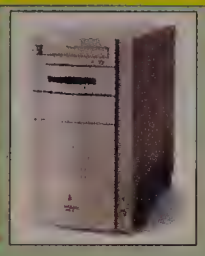

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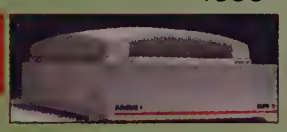

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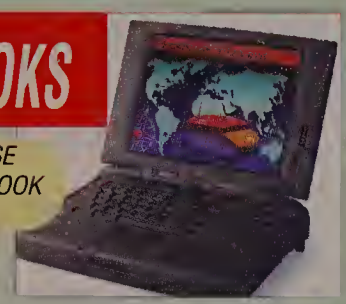

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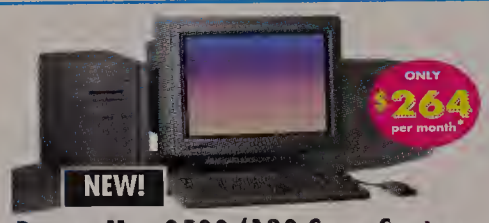

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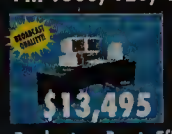

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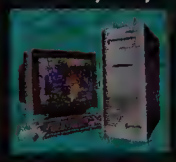

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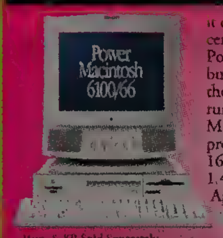

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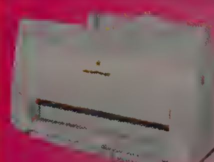

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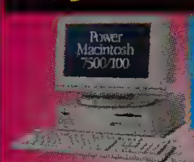

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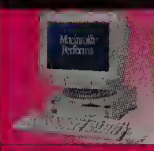

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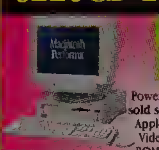

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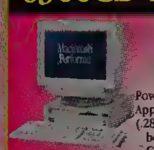

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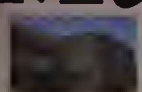

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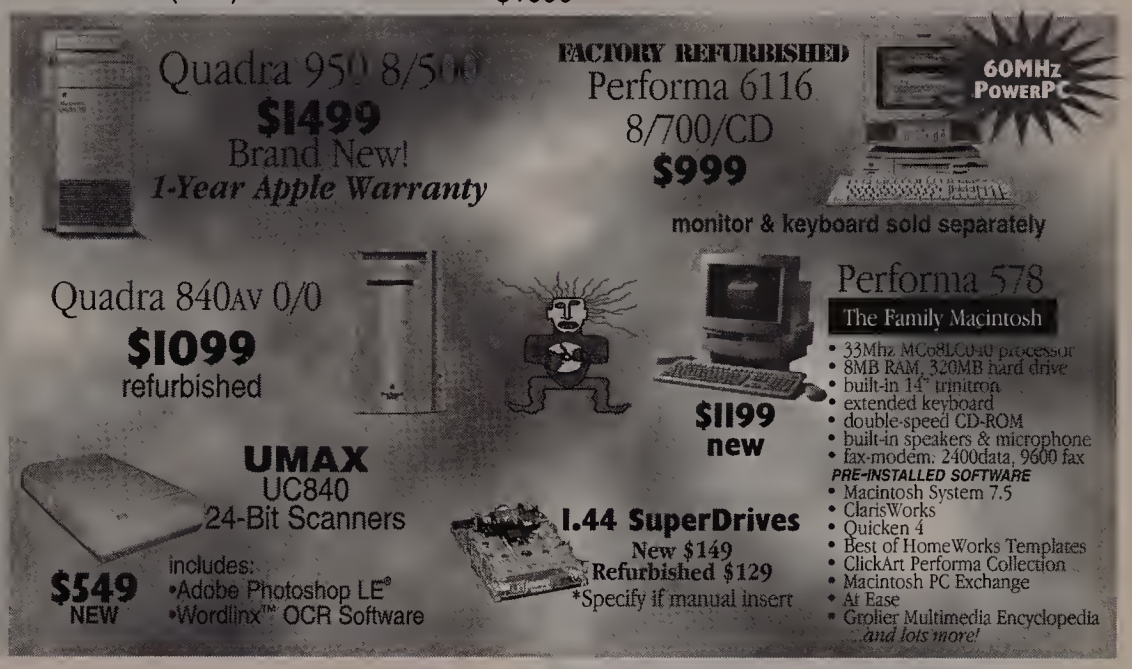

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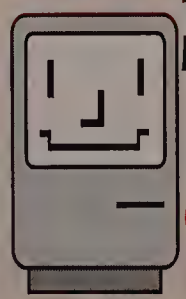

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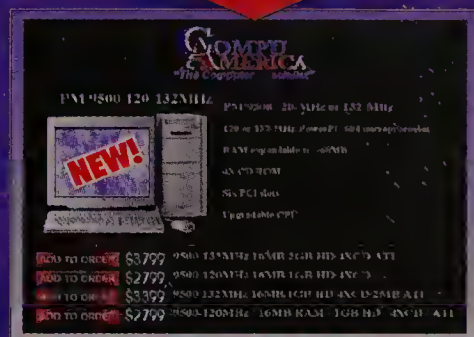

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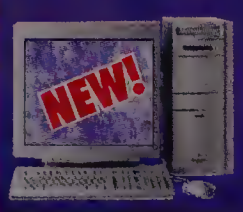

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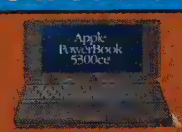
PowerBook



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5300	16/500	1399
5300CS	8/500	1999
5300CS	16/750	2459
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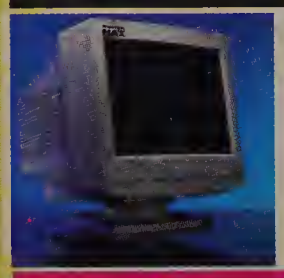

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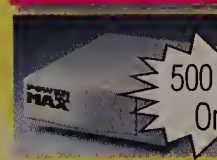

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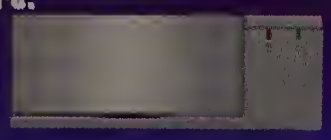

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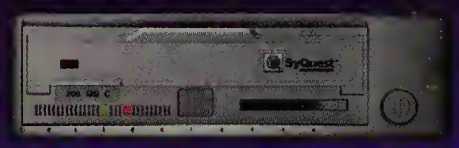

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Performa 6220	16/1GB/CD/TV	1749
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Apple	Multiscan 1710AV	930
Apple	Multiscan 20"	1876
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Sony	CPD17SF2 17"	859
NEC	XV15 15"	465
NEC	**XV17+ 17"**	**909**
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Radius	**Pressview 17"**	**945**
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Syquest	EZ-135 Drive	215
Iomega	Zip Drive	189
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Nikon	**Super Cool Scanner**	**1845**
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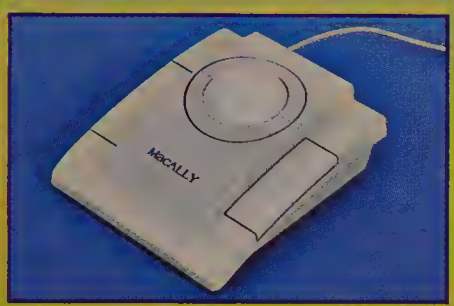

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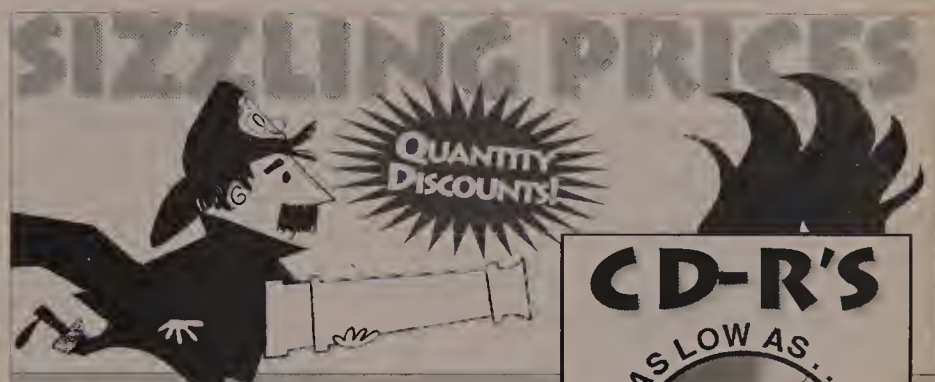

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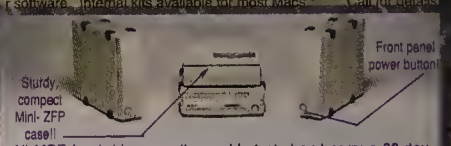

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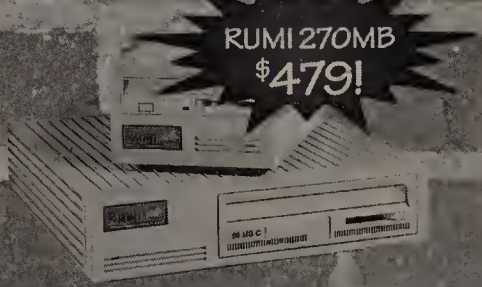

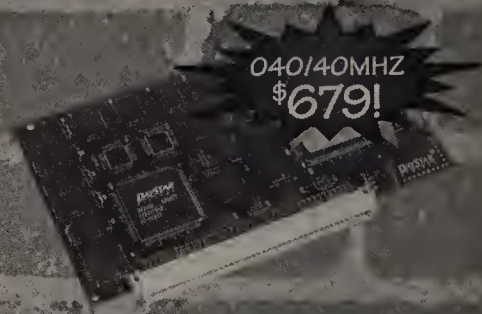

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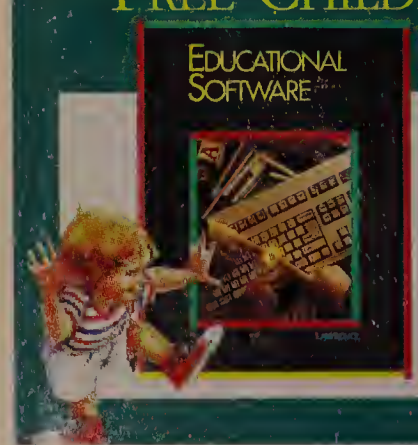

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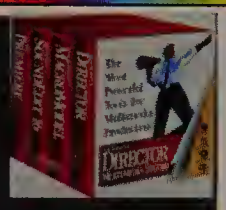

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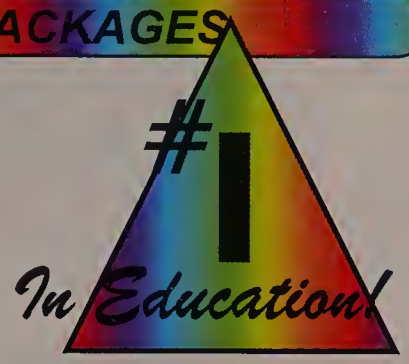

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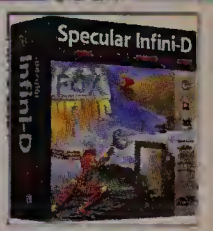

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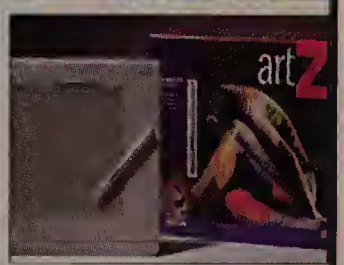

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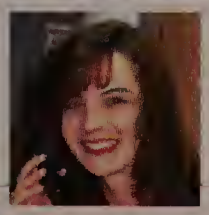

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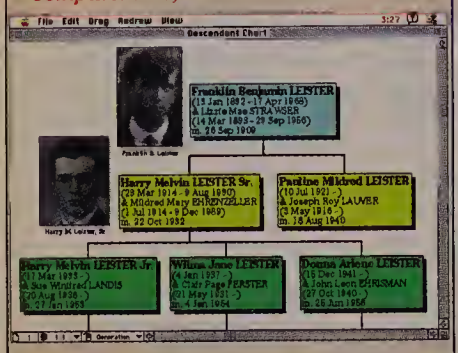

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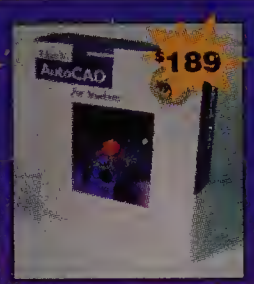

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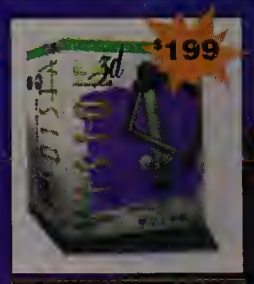

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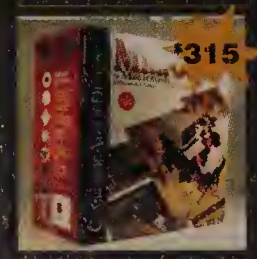

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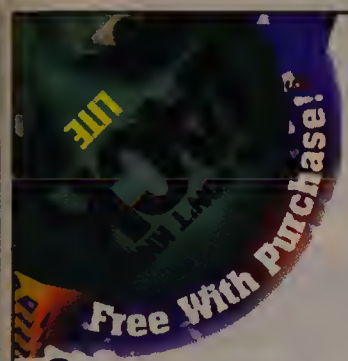

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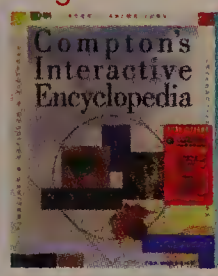

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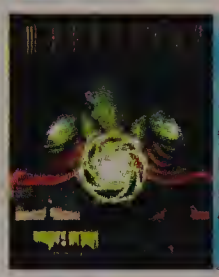

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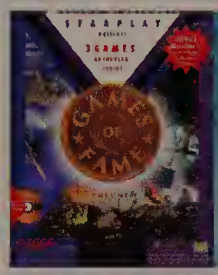

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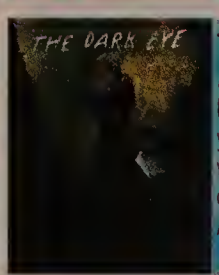

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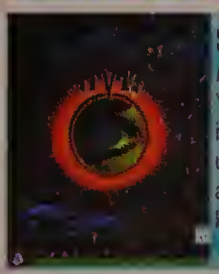

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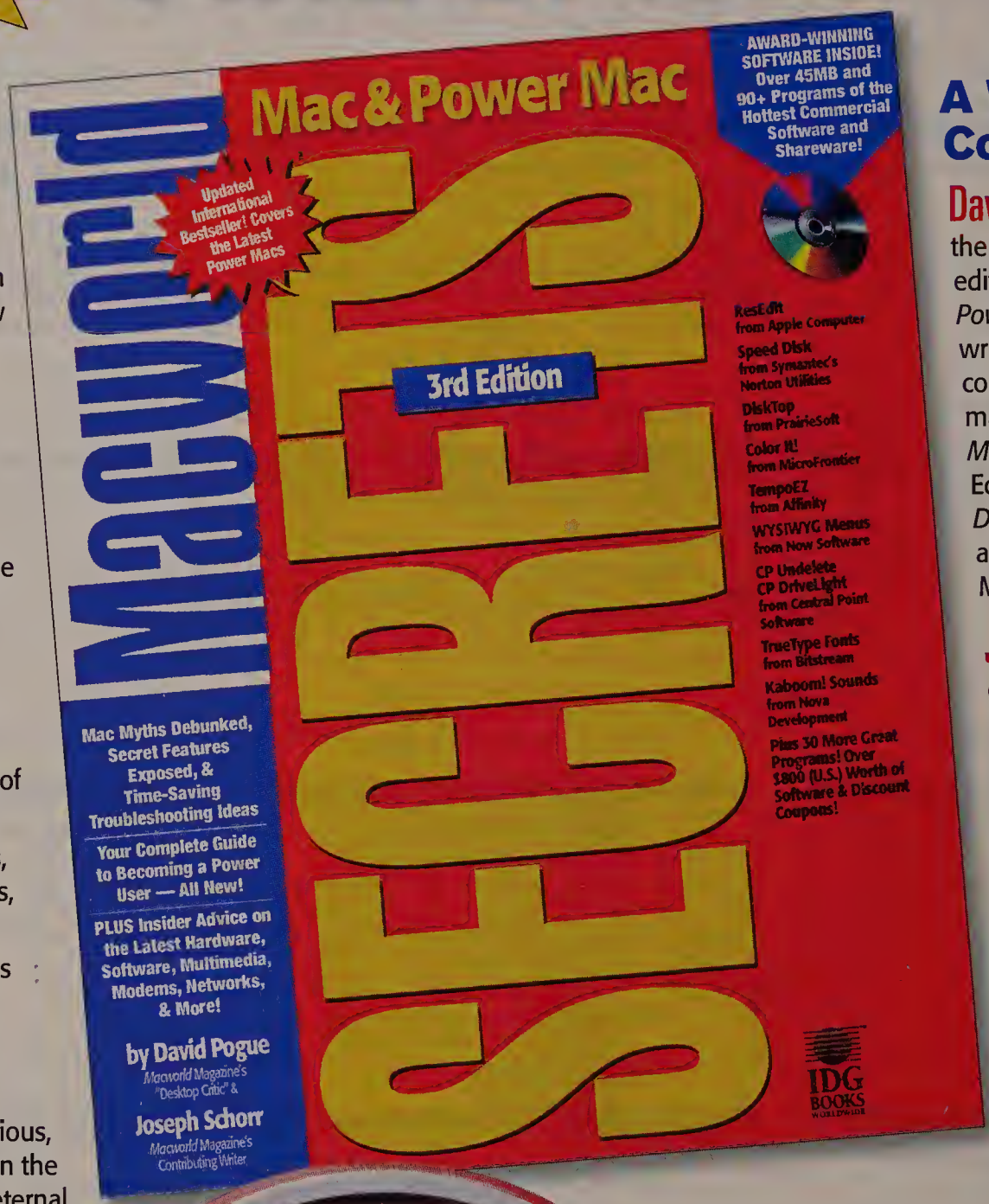

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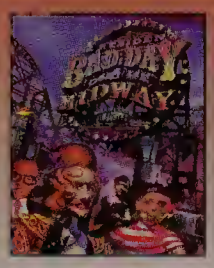

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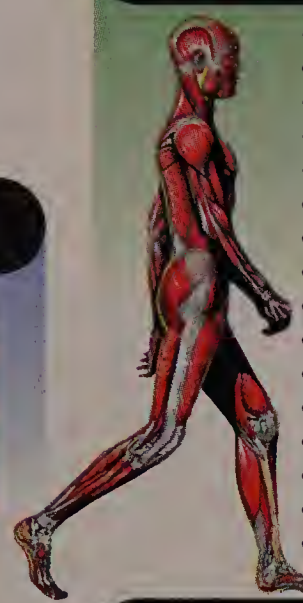

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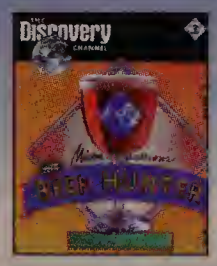

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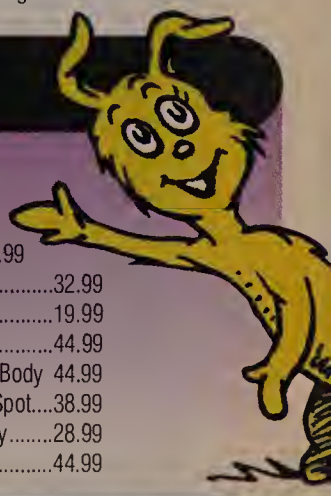

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Viewpoint

by Denise Caruso

Civil Rights Activists Say, "Sniff This!"

ENCRYPTION IS ONE SOLUTION TO NET CENSORSHIP

ON FEBRUARY 8, PRESIdent Clinton lifted his pen to sign the scabrous Telecommunications Reform Act of 1996. Under cover of increasing market competition for telephone and cable services, this law makes the most sweeping attack on free speech in U.S. history. In banning so-called indecent material, it is also likely to make illegal safe-sex discussion groups and any discussion of abortion—which, last I heard, was still a legal medical procedure.

The law is just one example of how our personal freedoms are fast eroding as digital technologies make it feasible to monitor electronic communications. Remember last year's half-billion-dollar "digital telephony" bill? It gave federal law-enforcement officials the power to force every phone company to ready its networks for surveillance. In short, data sniffers and their masters—whoever they may be—are finding ways to find out what you're up to, whoever you are and whatever you're doing, whether you're on the phone, sending E-mail, or surfing the Web.

Jim Warren, an industry activist and a founder of the annual Computers, Freedom, & Privacy conference, suggests that journalists and activists fight back by encrypting all their electronic communications—both E-mail and telephone conversations. But why stop with journalists and activists? Maybe it's time for us all to start encrypting what we say and write.

PGP Privacy Is Better Than None

Digital encryption uses a mathematical key to scramble a message so that neither human nor electronic snoopers can read it. The encryption technology that Warren proposes is called PGP, or Pretty Good Privacy, written by programmer Phil Zimmerman using a patented technique called public-key encryption (RSA Data Security holds the patent).

Voice mail provides the closest analogy for how PGP works. Just as I can give you my phone number, publish it in a directory, or even broadcast it on TV, I can give you my public key, which you then use to encrypt a message to me. I can only retrieve your message by using my private key, which in the case of voice mail is my password. Unlike voice mail, PGP also scrambles the message so that if some outsider intercepts it in transit or finds it in my mailbox, he or she still can't read it. And, if I use my private key to send you a message, I've effectively signed it, so you know that the message is mine, unaltered by anyone else.

Encryption is entirely legal for use inside U.S. borders. Yet encryption tech-

nologies, long used for protecting secret military and government communications, are legally regarded as munitions, as dangerous as a truck full of artillery shells, so are subject to strict export control. A few years ago someone anonymously published PGP on the global Internet, and Zimmerman was subjected to a three-year criminal investigation. (In early 1996 the government decided not to prosecute.)

Cause for Concern

Government security specialists are terrified of the widespread use of encryption, and with reason. Strong encryption widely available for free lets criminals of all stripes—child pornographers, terrorists, drug dealers, you name it—make their communications private and untappable.

And just imagine the weird stuff that could happen in the business world if disgruntled employees started encrypting corporate databases and throwing away the keys or holding them hostage. And since you can also use encryption to scramble files on your hard disk, you could accidentally inflict upon yourself a pretty horrible day/week/life if you ever forgot where you put the key.

In a perfect world, we wouldn't need to think about these things. We would not worry about who or what was sniffing our E-mail or listening to our phone calls or cruising our hard disks. Our elected officials would respect the primacy of the Constitution and the rights of the citizenry they serve, and address the real social ills from which criminal acts spring.

But since the world is far from perfect, anyone who uses a computer and the Internet should hear all sides of the encryption debate. The decision to encrypt personal communication within this country is a political act that we still have the luxury to practice today. It is already illegal in many countries to use encryption for any reason without a license from the government.

Comprehensive archives on encryption can be found at the Web site of the Electronic Frontier Foundation (*http://www.eff.org*), and through the Electronic Privacy Information Center (*http://www.epic.org*). You can download PGP and PGPfone (to encrypt voice communication) for noncommercial (domestic) use from the Web at *http://www-swiss.ai.mit.edu/~bal/pks-toplev.html*. ■

DENISE CARUSO is a journalist, analyst, and commentator on technology in society. Her *Digital Commerce* column appears in the *New York Times*.

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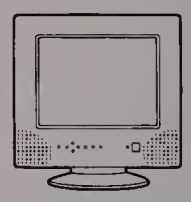

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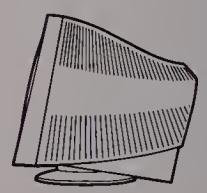

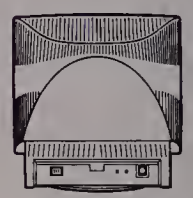

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